BOSCH INJECTION PUMP TEST SPECIFICATIONS

Obsereve notes in remark colum

Test sheet	: VW
Date of manufacture	:
Edition	: 30.05.1996
Replaces	:
Test oil	: ISO 4113
Injection pump	: VE5/11E1850L705
Type No.	: 0 460 415 987
Customer Ident.No.	:

Customer-specific details

Customer	: VW
Engine	: 2.5 SDI
Output kW	:
Speed 1/min	:

TEST BENCH PREREQUISITES

Inlet pressure, bar	: 0.30...0.40
Calibrating nozzle-holder assembly >	: 1 688 901 114
Opening pressure > bar	: 207...210
Test pressure line	: 1 680 750 085
Outer diameter	: 6.00
x wall thickness >	: 2.20
x length > mm	: 350
Overflow valve	: 2 467 413 018
Test line (fuel-delivery actuator)	: 0 986 612 444
Test line (solenoid valve start of injection)	: 1 687 011 208 (Test cable set)

TEST PRECONDITIONS

Test oil return temp. > °C with thermometer	: 55
Test oil supply temperature > °C	: 42...47
Hold-up revolutions >1/min	: 1200
Feedback voltage mV	: 2500

ELECTRICAL TEST

Actuator
Connections 5 and 6
Test temperature:

15°...30°C, ohms	: 0.4...1.0
50°...70°C, ohms	: 0.45...1.1
Connections 5 and. ground, Mohms min.	: 1.0
Connections 6 and ground, Mohms min.	: 1.0
Connections 3 and 5 Mohms min.	: 1.0
Connections 6 and 7 Mohms min.	: 1.0

High-pressure compressor sensor
Sensor coils
Connections 1 and 2

Ohms	: 4.9...6.5
Connections 2 and 3 Ohms	: 4.9...6.5
Connections 1 and 3 Ohms	: 9.8...13.0
Connections 1 and. ground, Mohms min.	: 1.0
Connections 2 and ground, Mohms min.	: 1.0
Connections 3 and ground, Mohms min.	: 1.0

Temperature sensor, fuel
Connentions 4 and 7
Test temperature:

15°...30°C, kohms	: 1.2...4.0
50°...70°C, kohms	: 0.3...1.2
Connections 4 and ground, Mohms min.	: 1.0
Connections 7 and ground Mohms min.	: 1.0

Solenoid valve, start of injection
Connections 1 and 2
Test temperature :

15°...30°C, ohms	: 14.3...17.3
50°...70°C, ohms	: 15.5...21.0
Starting stop mV	: 4120...4650
Shutoff stop mV	: 650...850

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Setting values of injection pump
Check values in brackets

Supply pump pressure:
Speed 1/min : 500
Checkbk. volt.
mV : 2520
Setting value, bar : 8.6...8.8

Timing device travel:
Speed 1/min : 500
Checkbk. volt
mV : 2520
Setting value, mm : 11.9...12.7

Full-load delivery :
1st temperature-conditioning
revolution 1/min : 2000
Checkbk. volt
mV : 2500
Output
temperature °C : 61
Speed 1/min : 750
Checkbk. volt
mV : 2290
Measuring
temperature °C : 57
Fuel delivery cm^3/
> 1000s : 31.1...31.5
Dispersion cm^3/ : 2.5
> 1000s :

Test specifications of injection pump
Check values in brackets

Supply pump pressure variations:

1st speed 1/min : 1850
Checkbk. volt
mV : 3670
Supply pump
pressure > bar : 10.4...11.0
> bar :

2st speed 1/min : 200
Checkbk. volt
mV : 2600
Supply pump
pressure > bar : 4.5...6.5
> bar :

Timing device variations:

1st speed 1/min : 200
Checkbk. volt. mV : 2600
Timing device
travel mm : 8.0...12.0
> mm : (7.0...13.0)

2nd speed 1/min : 1850
Checkbk. volt. mV : 3670
Timing device
travel mm : 11.8...12.8
> mm : (11.5...13.1)

3rd speed 1/min : 1100
Checkbk. volt. mV : 1800
Timing device
travel mm : max. 0.3
> mm : (max. 1.0)
Solenoid valve
Start of
injection, volts : 12

4.th speed 1/min : 500
Checkbk. volt. mV : 2520
Timing device
travel mm :
> mm : (11.5...13.1)

Overflow at overflow valve:

1st temperature-conditioning
revolution 1/min : 100
Checkbk. volt. mV : 2500
Output
temperature °C : 51
Speed 1/min : 1850
Checkbk. volt. mV : 3670
Measuring
temperature °C : 53
Overflow : 139...194
> cm^3/10s :

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Fuel delivery variations:

1st temperature-conditioning
revolution 1/min : 100
Checkbk. volt mV : 2500
Output
temperature °C : 51
Speed 1/min : 1850
Checkbk. volt mV : 3670
Meßtemperatur °C : 53
Fuel delivery cm³/ : 50.2...52.8
> 1000s : (49.5...53.5)
Dispersion cm³/ : 3.0
> 1000s. : (3.0)

2nd temperature-conditioning
revolution 1/min : 2000
Checkbk. volt mV : 2500
Output
temperature °C : 61
Speed 1/min : 750
Checkbk. volt mV : 2290
Measuring
temperature °C : 57
Fuel delivery cm³/ :
> 1000s : (30.0...32.6)
Dispersion cm³/ :
> 1000s : (2.5)

3rd temperature-conditioning
revolution 1/min : 2000
Checkbk. volt mV : 2500
Output
temperature °C : 61
Speed 1/min : 500
Checkbk. volt mV : 2520
Measuring
temperature °C : 57
Fuel delivery cm³/ : 43.3...45.9
> 1000s : (42.6...46.6)
Dispersion cm³/ : 3.0
> 1000s : (3.0)

Idle delivery:
1st temperature-conditioning
revolution 1/min : 2000
Checkbk. volt mV : 2500
Output
temperature °C : 61
Speed 1/min : 400
Checkbk. volt mV : 1910
Meßtemperatur °C : 57
Fuel delivery cm³/ : 13.9...17.9
> 1000s : (12.9...18.9)
Solenoid valve
Start of
injection, volts : 12
Dispersion cm³/ : 3.0
> 1000s : (4.0)

Starting fuel delivery:
1st temperature-conditioning
revolution 1/min : 2000
Checkbk. volt mV : 2500
Output
temperature °C : 65
Speed 1/min : 100
Checkbk. volt mV : 2690
Measuring
temperature °C : 61
Fuel delivery cm³/ : 54.0...66.0
> 1000s : (49.0...71.0)
Solenoid valve
Start of
injection, volts : 12

Stop test:
Speed 1/min : 1000
Checkbk. volt mV : 2290
ELAB volts : 0
Fuel delivery cm³/ :
max. 1000s : 3.0
Start of

Shutoff solenoid:
Cut-in voltage
min.> volts : 10.0
Rated voltage,
volts : 12.0

Notes:
High-pressure compressor sensor
Testing only possible with ballast
EPS 910

Take note of test instructions
"Distributor pump for direct
injectors"!

Dimensions for mounting and setting:

Description		
K	mm	: 3.2...3.4
KF	mm	: 8.2...8.6
SVS max.	mm	:
FH	mm	:
TS		: 1 467 010 495

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BOSCH INJECTION PUMP TEST SPECIFICATIONS

Obsereve notes in remark colum

Test sheet	: MB
Date of manufacture	:
Edition	: 01.05.1996
Replaces	:
Test oil	: ISO 4113
Injection pump	: VE5/11E1900R685
Type No.	: 0 460 415 988
Customer Ident.No.	:

Customer-specific details

Customer	: Mercedes-Benz
Engine	: OM 602 DELA 29
Output kW	:
Speed 1/min	:

TEST BENCH PREREQUISITES

Inlet pressure, bar	: 0.30...0.40
Calibrating nozzle-holder assembly >	: 1 688 901 116
Opening pressure > bar	: 207...210
Test pressure line	: 1 680 750 085
Outer diameter	: 6.00
x wall thickness >	: 2.20
x length > mm	: 350
Overflow valve	: 2 467 413 018
Test line (fuel-delivery actuator)	: 0 986 612 698 (KDEP 1865/10)
Test line (solenoid valve start of injection)	: Prüfkabelset (1 687 011 208)

TEST PRECONDITIONS

Test oil return temp. > °C with thermometer	: 55
Test oil supply temperature > °C	: 42...47
Hold-up revolutions >1/min	: 1200
Feedback voltage mV	: 2500

ELECTRICAL TEST

Actuator
Connections 12 and 13
Test temperature:

15°...30°C, ohms	: 0.4...1.0
50°...70°C, ohms	: 0.45...1.1
Connections 13 and. ground, Mohms min.	: 1.0
Connections 12 and ground, Mohms min.	: 1.0
Connections 8 and 13 Mohms min.	: 1.0
Connections 12 and 1 Mohms min.	: 1.0

High-pressure compressor sensor
Sensor coils
Connections 8 and 7

Ohms	: 4.9...6.5

Connections 6 and 7

Ohms	: 4.9...6.5

Connections 6 and 8

Ohms	: 9.8...13.0
Connections 6 and. ground, Mohms min.	: 1.0
Connections 7 and ground, Mohms min.	: 1.0
Connections 8 and ground, Mohms min.	: 1.0

Temperature sensor, fuel
Connentions 1 and 2
Test temperature:

15°...30°C, kohms	: 1.2...4.0
50°...70°C, kohms	: 0.3...1.2
Connections 1 and ground, Mohms min.	: 1.0
Connections 2 and ground Mohms min.	: 1.0

Solenoid valve, start of injection
Connections 1 and 2
Test temperature :

15°...30°C, ohms	: 14.3...17.3
50°...70°C, ohms	: 15.5...21.0
Starting stop mV	: 4120...4650
Shutoff stop mV	: 650...850

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Setting values of injection pump
Check values in brackets

Supply pump pressure:

Speed	1/min	: 500
Checkbk. volt. mV		: 2550
Setting value, bar		: 9.3...9.5
		:

Timing device travel:

Speed	1/min	: 500
Checkbk. volt mV		: 2500
Setting value, mm		: 11.4...12.2
		: (11.0...12.6)

Full-load delivery :

1st temperature-conditioning revolution	1/min	: 2000
Checkbk. volt mV		: 2500
Output temperature °C		: 61
Speed	1/min	: 750
Checkbk. volt mV		: 2500
Measuring temperature °C		: 57
Fuel delivery	cm³/1000s	: 50.8...51.2
>	1000s	: (49.0...53.0)
Dispersion	cm³/1000s	: 2.5
>	1000s	:

Test specifications of injection pump
Check values in brackets

Supply pump pressure variations:

1st speed	1/min	: 1900
Checkbk. volt mV		: 3520
Supply pump pressure >	bar	: 11.3...11.9
>	bar	:

2st speed	1/min	: 200
Checkbk. volt mV		: 2550
Supply pump pressure >	bar	: 4.5...6.5
>	bar	:

Timing device variations:

1st speed	1/min	: 1900
Checkbk. volt. mV		: 3520
Timing device travel	mm	: 11.8...12.8
>	mm	: (11.5...13.1)

2nd speed	1/min	: 200
Checkbk. volt. mV		: 2550
Timing device travel	mm	: 3.0...6.0
>	mm	: (1.3...7.7)

3rd speed	1/min	: 1500
Checkbk. volt. mV		: 1515
Timing device travel	mm	: 0...3.5
>	mm	:
Solenoid valve Start of injection,	volts	: 12

4.th speed	1/min	: 1100
Checkbk. volt. mV		: 1530
Timing device travel	mm	: 0...0.5
>	mm	: (0...0.8)
Start of injection,	volts	: 12

Overflow at overflow valve:

1st temperature-conditioning revolution	1/min	: 100
Checkbk. volt. mV		: 2500
Output temperature °C		: 51
Speed	1/min	: 1900
Checkbk. volt. mV		: 3570
Measuring temperature °C		: 53
Overflow		: 137...192
>	cm³/10s	: (123...206)

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Fuel delivery variations:

1st temperature-conditioning
revolution 1/min : 100
Checkbk. volt mV : 2500
Output
temperature °C : 51
Speed 1/min : 1900
Checkbk. volt mV : 3520
Meßtemperatur °C : 53
Fuel delivery cm³/ : 64.1...66.5
> 1000s : (62.6...68.0)
Dispersion cm³/ : 2.5
> 1000s. :

2nd temperature-conditioning
revolution 1/min : 2000
Checkbk. volt mV : 2500
Output
temperature °C : 60
Speed 1/min : 1000
Checkbk. volt mV : 3150
Measuring
temperature °C : 56
Fuel delivery cm³/ : 69.7...72.3
> 1000s : (69.0...73.0)
Dispersion cm³/ : 2.5
> 1000s : (4.0)

3rd temperature-conditioning
revolution 1/min : 2000
Checkbk. volt mV : 2500
Output
temperature °C : 61
Speed 1/min : 500
Checkbk. volt mV : 2550
Measuring
temperature °C : 57
Fuel delivery cm³/ : 58.6...61.2
> 1000s : (57.9...61.9)
Dispersion cm³/ : 3.0
> 1000s :

Idle delivery:
1st temperature-conditioning
revolution 1/min : 2000
Checkbk. volt mV : 2500
Output
temperature °C : 61
Speed 1/min : 340
Checkbk. volt mV : 2000
Meßtemperatur °C : 57
Fuel delivery cm³/ : 13.6...17.6
> 1000s : (12.6...18.6)
Solenoid valve
Start of
injection, volts : 12
Dispersion cm³/ : 3.0
> 1000s : (4.0)

Starting fuel delivery:
1st temperature-conditioning
revolution 1/min : 2000
Checkbk. volt mV : 2500
Output
temperature °C : 65
Speed 1/min : 100
Checkbk. volt mV : 3060
Measuring
temperature °C : 61
Fuel delivery cm³/ : 70.0
> 1000s :
Solenoid valve
Start of
injection, volts : 12

Stop test:
Speed 1/min : 1000
Checkbk. volt mV : 4020
ELAB volts : 0
Fuel delivery cm³/ :
max. 1000s : 3.0
Start of

Shutoff solenoid:
Cut-in voltage
min.> volts : 10.0
Rated voltage,
volts : 12.0

Notes:
High-pressure compressor sensor
Testing only possible with ballast
EPS 910

Take note of test instructions
"Distributor pump for direct
injectors"!

Dimensions for mounting and setting:

Description
K mm :
KF mm : 8.2...8.6
SVS max. mm :
FH mm :
TS : 1 467 010 495

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BOSCH INJECTION PUMP TEST SPECIFICATIONS

Obsereve notes in remark colum

Test sheet	: MB
Date of manufacture	:
Edition	: 14.11.1995
Replaces	:
Test oil	: ISO 4113
Injection pump	: VE5/11E2000R642
Type No.	: 0 460 415 991
Customer Ident.No.	:

Customer-specific details

Customer	: Mercedes-Benz
Engine	:
Output kW	:
Speed 1/min	:

TEST BENCH PREREQUISITES

Inlet pressure, bar	: 0.30...0.40
Calibrating nozzle-holder assembly >	: 1 688 901 116
Opening pressure > bar	: 207...210
Test pressure line	: 1 680 750 085
Outer diameter	: 6.00
x wall thickness >	: 2.20
x length > mm	: 350
Overflow valve	: 2 467 413 018
Test line (fuel-delivery actuator)	: 0 986 612 698
Test line (solenoid valve start of injection)	: Prüfkabelset (1 687 011 208)

TEST PRECONDITIONS

Test oil return temp. > °C with thermometer	: 55
Test oil supply temperature > °C	: 42...47
Hold-up revolutions >1/min	: 1200
Feedback voltage mV	: 2500

ELECTRICAL TEST

Actuator
Connections 12 and 13
Test temperature:

15°...30°C, ohms	: 0.4...1.0
50°...70°C, ohms	: 0.45...1.1
Connections 13 and. ground, Mohms min.	: 1.0
Connections 12 and ground, Mohms min.	: 1.0
Connections 8 and 13 Mohms min.	: 1.0
Connections 12 and 1 Mohms min.	: 1.0

High-pressure compressor sensor
Sensor coils
Connections 8 and 7

Ohms	: 4.9...6.5
Connections 6 and 7 Ohms	: 4.9...6.5
Connections 6 and 8 Ohms	: 9.8...13.0
Connections 6 and. ground, Mohms min.	: 1.0
Connections 7 and ground, Mohms min.	: 1.0
Connections 8 and ground, Mohms min.	: 1.0

Temperature sensor, fuel
Connentions 1 and 2
Test temperature:

15°...30°C, kohms	: 1.2...4.0
50°...70°C, kohms	: 0.3...1.2
Connections 1 and ground, Mohms min.	: 1.0
Connections 2 and ground Mohms min.	: 1.0

Solenoid valve, start of injection
Connections 1 and 2
Test temperature :

15°...30°C, ohms	: 14.3...17.3
50°...70°C, ohms	: 15.5...21.0
Starting stop mV	: 4120...4650
Shutoff stop mV	: 650...850

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Setting values of injection pump
Check values in brackets

Supply pump pressure:

Speed	1/min	: 500
Checkbk. volt. mV		: 2620
Setting value, bar		: 9.3...9.5
		: (9.1...9.7)

Timing device travel:

Speed	1/min	: 500
Checkbk. volt mV		: 2620
Setting value, mm		: 11.9...12.7
		: (11.0...13.6)

Full-load delivery :

1st temperature-conditioning revolution	1/min	: 2000
Checkbk. volt mV		: 2500
Output temperature °C		: 61
Speed	1/min	: 750
Checkbk. volt mV		: 2520
Measuring temperature °C		: 57
Fuel delivery	cm³/ 1000s	: 51.3...51.7
>		: (49.5...53.5)
Dispersion	cm³/ 1000s	: 2.5
>		:

Test specifications of injection pump
Check values in brackets

Supply pump pressure variations:

1st speed	1/min	: 2000
Checkbk. volt mV		: 3570
Supply pump pressure >	bar	: 11.5...12.1
>	bar	: (11.3...12.3)
2st speed	1/min	: 200
Checkbk. volt mV		: 2620
Supply pump pressure >	bar	: 4.5...6.5
>	bar	: (4.3...6.7)

Timing device variations:

1st speed	1/min	: 2000
Checkbk. volt. mV		: 3570
Timing device travel	mm	: 11.8...12.8
>	mm	: (11.6...13.0)
2nd speed	1/min	: 200
Checkbk. volt. mV		: 2620
Timing device travel	mm	: 8.5...11.5
>	mm	: (7.5...12.5)
3rd speed	1/min	: 2000
Checkbk. volt. mV		: 1500
Timing device travel	mm	: 0...3.5
>	mm	:
Solenoid valve Start of injection,	volts	: 12
4.th speed	1/min	: 1100
Checkbk. volt. mV		: 1530
Timing device travel	mm	: 0...0.6
>	mm	: (0...0.8)
Solenoid valve Start of injection,	volts	: 12

Overflow at overflow valve:

1st temperature-conditioning revolution	1/min	: 100
Checkbk. volt. mV		: 2500
Output temperature °C		: 51
Speed	1/min	: 1900
Checkbk. volt. mV		: 3570
Measuring temperature °C		: 53
Overflow		: 137...192
>	cm³/10s	: (123...206)

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Fuel delivery variations:

1st temperature-conditioning
revolution 1/min : 100
Checkbk. volt mV : 2500
Output
temperature °C : 51
Speed 1/min : 2000
Checkbk. volt mV : 3570
Meßtemperatur °C : 53
Fuel delivery cm³/ : 66.8...69.2
> 1000s : (65.3...70.7)
Dispersion cm³/ : 2.5
> 1000s. :

2nd temperature-conditioning
revolution 1/min : 2000
Checkbk. volt mV : 2500
Output
temperature °C : 60
Speed 1/min : 1000
Checkbk. volt mV : 3080
Measuring
temperature °C : 56
Fuel delivery cm³/ : 69.3...71.9
> 1000s : (68.6...72.6)
Dispersion cm³/ : 4.0
> 1000s :

3rd temperature-conditioning
revolution 1/min : 2000
Checkbk. volt mV : 2500
Output
temperature °C : 61
Speed 1/min : 500
Checkbk. volt mV : 2620
Measuring
temperature °C : 57
Fuel delivery cm³/ : 62.7...65.3
> 1000s : (62.0...66.0)
Dispersion cm³/ :
> 1000s :

Idle delivery:
1st temperature-conditioning
revolution 1/min : 2000
Checkbk. volt mV : 2500
Output
temperature °C : 61
Speed 1/min : 340
Checkbk. volt mV : 2000
Meßtemperatur °C : 57
Fuel delivery cm³/ : 13.0...18.0
> 1000s :
Solenoid valve
Start of
injection, volts : 12
Dispersion cm³/ : 3.0
> 1000s : (4.0)

Starting fuel delivery:
1st temperature-conditioning
revolution 1/min : 2000
Checkbk. volt mV : 2500
Output
temperature °C : 65
Speed 1/min : 100
Checkbk. volt mV : 3110
Measuring
temperature °C : 61
Fuel delivery cm³/ : 75.6
> 1000s :
Solenoid valve
Start of
injection, volts : 12

Stop test:
Speed 1/min : 1000
Checkbk. volt mV : 4000
ELAB volts : 0
Fuel delivery cm³/ :
max. 1000s : 3.0
Start of

Shutoff solenoid:
Cut-in voltage
min.> volts : 10.0
Rated voltage,
volts : 12.0

Notes:
High-pressure compressor sensor
Testing only possible with ballast
EPS 910

Take note of test instructions
"Distributor pump for direct
injectors"!

Dimensions for mounting and setting:

Description
K mm :
KF mm : 8.2...8.6
SVS max. mm :
FH mm :
TS : 1 467 010 495

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BOSCH INJECTION PUMP TEST SPECIFICATIONS

Obsereve notes in remark colum

Test sheet	: Audi
Date of manufacture	:
Edition	: 30.05.1994
Replaces	:
Test oil	: ISO 4113
Injection pump	: VE5/11E2300L460-1
Type No.	: 0 460 415 994
Customer Ident.No.	:

Customer-specific details

Customer	: Audi
Engine	: 180-02-TDI-C4
Output kW	:
Speed 1/min	:

TEST BENCH PREREQUISITES

Inlet pressure, bar	: 0.30...0.40
Calibrating nozzle-holder assembly >	: 1 688 901 114
Opening pressure > bar	: 207...210
Test pressure line	: 1 680 750 085
Outer diameter	: 6.00
x wall thickness >	: 2.20
x length > mm	: 350
Overflow valve	: 2 467 413 009
Test line (fuel-delivery actuator)	: 0 986 612 440
Test line Solenoid valve start of injection)	: 0 986 612 435

TEST PRECONDITIONS

Test oil return temp. > °C with thermometer	: 55
Test oil supply temperature > °C	: 42...47
Hold-up revolutions >1/min	: 1200
Feedback voltage mV	: 2500

ELECTRICAL TEST

Actuator
Connections 4 and 7
Test temperature:

15°...30°C, ohms	: 0.4...1.0
50°...70°C, ohms	: 0.45...1.1
Connections 4 and. ground, Mohms min.	: 1.0
Connections 7 and ground, Mohms min.	: 1.0
Connections 2 and 7 Mohms min.	: 1.0
Connections 4 and 6 Mohms min.	: 1.0

High-pressure compressor sensor
Sensor coils
Connections 1 and 3

Ohms	: 4.9...6.5
Connections 2 and 3 Ohms	: 4.9...6.5
Connections 1 and 2 Ohms	: 9.8...13.0
Connections 1 and. ground, Mohms min.	: 1.0
Connections 2 and ground, Mohms min.	: 1.0
Connections 3 and ground, Mohms min.	: 1.0

Temperature sensor, fuel
Connentions 5 and 6
Test temperature:

15°...30°C, kohms	: 1.2...4.0
50°...70°C, kohms	: 0.3...1.2
Connections 5 and ground, Mohms min.	: 1.0
Connections 6 and ground Mohms min.	: 1.0

Solenoid valve, start of injection
Connections 1 and 2
Test temperature :

15°...30°C, ohms	: 14.3...17.3
50°...70°C, ohms	: 15.5...21.0
Starting stop mV	: 4120...4650
Shutoff stop mV	: 650...850

A10

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Setting values of injection pump
Check values in brackets

Supply pump pressure:

Speed	1/min	: 750
Checkbk. volt. mV		: 3900
Setting value, bar		: 6.0...7.0

Timing device travel:

Speed	1/min	: 750
Checkbk. volt mV		: 3900
Setting value, mm		: 9.3...9.5

Full-load delivery :

1st temperature-conditioning revolution	1/min	: 2125
Checkbk. volt mV		: 2500
Output temperature °C		: 61
Speed	1/min	: 750
Checkbk. volt mV		: 2460
Measuring temperature °C		: 57
Fuel delivery	cm³/1000s	: 40.8...41.2
>		
Dispersion	cm³/1000s	: 2.5
>		:

Test specifications of injection pump
Check values in brackets

Supply pump pressure variations:

1st speed	1/min	: 2125
Checkbk. volt mV		: 3900
Supply pump pressure >	bar	: 7.9...8.9
>	bar	:

Timing device variations:

1st speed	1/min	: 500
Checkbk. volt. mV		: 3900
Timing device travel	mm	: 7.5...9.9
>	mm	: (7.2...10.2)
2nd speed	1/min	: 750
Checkbk. volt. mV		: 3900
Timing device travel	mm	:
>	mm	: (7.5...11.3)
3rd speed	1/min	: 1200
Checkbk. volt. mV		: 1800
Timing device travel	mm	: max. 0.3
>	mm	: (max. 2.5)
Solenoid valve Start of injection, volts		: 12
4.th speed	1/min	: 2125
Checkbk. volt. mV		: 3900
Timing device travel	mm	: 11.6...12.6
>	mm	: (11.5...12.7)

Overflow at overflow valve:

1st temperature-conditioning revolution	1/min	: 100
Checkbk. volt. mV		: 2500
Output temperature °C		: 51
Speed	1/min	: 2125
Checkbk. volt. mV		: 3900
Measuring temperature °C		: 53
Overflow		: 97...180
>	cm³/10s	:

A11

A 11

Fuel delivery variations:

1st temperature-conditioning
revolution 1/min : 100
Checkbk. volt mV : 2500
Output
temperature °C : 51
Speed 1/min : 2125
Checkbk. volt mV : 3910
Meßtemperatur °C : 53
Fuel delivery cm³/ : 55.7...58.3
> 1000s : (55.0...59.0)
Dispersion cm³/ : 3.0
> 1000s. :

2nd temperature-conditioning
revolution 1/min : 2125
Checkbk. volt mV : 2500
Output
temperature °C : 60
Speed 1/min : 1000
Checkbk. volt mV : 3210
Measuring
temperature °C : 56
Fuel delivery cm³/ : 56.8...59.4
> 1000s : (56.1...60.1)
Dispersion cm³/ : 3.0
> 1000s :

3rd temperature-conditioning
revolution 1/min : 2125
Checkbk. volt mV : 2500
Output
temperature °C : 61
Speed 1/min : 750
Checkbk. volt mV : 2460
Measuring
temperature °C : 57
Fuel delivery cm³/ :
> 1000s : (39.7...42.3)
Dispersion cm³/ :
> 1000s :

4th temperature-conditioning
revolution 1/min : 2125
Checkbk. volt mV : 2500
Output
temperature °C : 61
Speed 1/min : 500
Checkbk. volt mV : 2320
Measuring
temperature °C : 57
Fuel delivery cm³/ : 41.9...44.5
> 1000s : (41.2...45.2)
Dispersion cm³/ : 3.0
> 1000s :

Idle delivery:

1st temperature-conditioning
revolution 1/min : 2125
Checkbk. volt mV : 2500
Output
temperature °C : 61
Speed 1/min : 500
Checkbk. volt mV : 1520
Meßtemperatur °C : 57
Fuel delivery cm³/ : 10.2...13.5
> 1000s : (9.2...15.2)
Solenoid valve
Start of
injection, volts : 12
Dispersion cm³/ : 3.0
> 1000s : (4.0)

Starting fuel delivery:

1st temperature-conditioning
revolution 1/min : 2125
Checkbk. volt mV : 2500
Output
temperature °C : 65
Speed 1/min : 100
Checkbk. volt mV : 2960
Measuring
temperature °C : 61
Fuel delivery cm³/ : 79.0
> 1000s :
Solenoid valve
Start of
injection, volts : 12

Stop test:

Speed 1/min : 1500
Checkbk. volt mV : 4125
ELAB volts : 0
Fuel delivery cm³/ :
max. 1000s : 3.0
Solenoid valve
Start of
injection, volts : 12

Shutoff solenoid:
Cut-in voltage
min.> volts : 10.0
Rated voltage,
volts : 12.0

A12

A12

Notes:
High-pressure compressor sensor
Testing only possible with ballast
EPS 910

Take note of test instructions
"Distributor pump for direct
injectors"!

Dimensions for mounting and setting:

Description		
K	mm	: 2.7...2.9
KF	mm	: 6.5...6.9
SVS max.	mm	:
FH	mm	:
TS		: 1 467 010 494

A13

A13

BOSCH INJECTION PUMP TEST SPECIFICATIONS

Obsereve notes in remark colum

Test sheet	: MB
Date of manufacture	:
Edition	: 05.07.1994
Replaces	:
Test oil	: ISO 4113
Injection pump	: VE5/11E1900R595
Type No.	: 0 460 415 995
Customer Ident.No.	:

Customer-specific details

Customer	: Mercedes-Benz
Engine	: OM 602 DELA 29
Output kW	:
Speed 1/min	:

TEST BENCH PREREQUISITES

Inlet pressure, bar	: 0.30...0.40
Calibrating nozzle-holder assembly >	: 1 688 901 116
Opening pressure > bar	: 207...210
Test pressure line	: 1 680 750 085
Outer diameter	: 6.00
x wall thickness >	: 2.20
x length > mm	: 350
Overflow valve	: 2 467 413 018
Test line (fuel-delivery actuator)	: 0 986 612 698
Test line (solenoid valve start of injection)	: Prüfkabelset (1 687 011 208)

TEST PRECONDITIONS

Test oil return temp. > °C with thermometer	: 55
Test oil supply temperature > °C	: 42...47
Hold-up revolutions >1/min	: 1200
Feedback voltage mV	: 2500

ELECTRICAL TEST

Actuator
Connections 12 and 13
Test temperature:

15°...30°C, ohms	: 0.4...1.0
50°...70°C, ohms	: 0.45...1.1
Connections 13 and. ground, Mohms min.	: 1.0
Connections 12 and ground, Mohms min.	: 1.0
Connections 8 and 13 Mohms min.	: 1.0
Connections 12 and 1 Mohms min.	: 1.0

High-pressure compressor sensor
Sensor coils
Connections 8 and 7

Ohms	: 4.9...6.5
Connections 6 and 7 Ohms	: 4.9...6.5
Connections 6 and 8 Ohms	: 9.8...13.0
Connections 6 and. ground, Mohms min.	: 1.0
Connections 7 and ground, Mohms min.	: 1.0
Connections 8 and ground, Mohms min.	: 1.0

Temperature sensor, fuel
Connentions 1 and 2
Test temperature:

15°...30°C, kohms	: 1.2...4.0
50°...70°C, kohms	: 0.3...1.2
Connections 4 and ground, Mohms min.	: 1.0
Connections 7 and ground Mohms min.	: 1.0

Solenoid valve, start of injection
Connections 1 and 2
Test temperature :

15°...30°C, ohms	: 14.3...17.3
50°...70°C, ohms	: 15.5...21.0
Starting stop mV	: 4120...4650
Shutoff stop mV	: 650...850

A14

A14

Setting values of injection pump
Check values in brackets

Supply pump pressure:

Speed	1/min	: 500
Checkbk. volt. mV		: 2430
Setting value, bar		: 7.1...7.3
		:

Timing device travel:

Speed	1/min	: 500
Checkbk. volt mV		: 2430
Setting value, mm		: 11.6...12.6
		: (10.8...13.4)

Full-load delivery :

1st temperature-conditioning revolution	1/min	: 2000
Checkbk. volt mV		: 2500
Output temperature °C		: 61
Speed	1/min	: 750
Checkbk. volt mV		: 2360
Measuring temperature °C		: 57
Fuel delivery	cm³/	: 43.3...43.7
>	1000s	: (41.7...45.3)
Dispersion	cm³/	: 2.5
>	1000s	:

Test specifications of injection pump
Check values in brackets

Supply pump pressure variations:

1st speed	1/min	: 1900
Checkbk. volt mV		: 3530
Supply pump pressure >	bar	: 9.0...9.6
>	bar	:

2st speed	1/min	: 200
Checkbk. volt mV		: 2430
Supply pump pressure >	bar	: 4.9...6.9
>	bar	:

Timing device variations:

1st speed	1/min	: 1900
Checkbk. volt. mV		: 3530
Timing device travel	mm	: 11.8...12.8
>	mm	: (11.5...13.1)

2nd speed	1/min	: 200
Checkbk. volt. mV		: 2430
Timing device travel	mm	: 8.0...11.0
>	mm	: (7.0...12.0)

3rd speed	1/min	: 1000
Checkbk. volt. mV		: 1460
Timing device travel	mm	: max. 0.5
>	mm	:
Solenoid valve Start of injection,	volts	: 12

Overflow at overflow valve:

1st temperature-conditioning revolution	1/min	: 100
Checkbk. volt. mV		: 2500
Output temperature °C		: 51
Speed	1/min	: 1900
Checkbk. volt. mV		: 3530
Measuring temperature °C		: 53
Overflow		: 111...167
>	cm³/10s	: (83...194)

A15

A15

Fuel delivery variations:

1st temperature-conditioning		
revolution	1/min	: 100
Checkbk. volt	mV	: 2500
Output		
temperature	°C	: 51
Speed	1/min	: 1900
Checkbk. volt	mV	: 3530
Meßtemperatur	°C	: 53
Fuel delivery	cm³/	: 63.8...67.8
>	1000s	: (62.6...68.0)
Dispersion	cm³/	: 2.5
>	1000s.	:

2nd temperature-conditioning		
revolution	1/min	: 2000
Checkbk. volt	mV	: 2500
Output		
temperature	°C	: 60
Speed	1/min	: 1000
Checkbk. volt	mV	: 3120
Measuring		
temperature	°C	: 56
Fuel delivery	cm³/	: 69.5...72.1
>	1000s	: (68.8...72.8)
Dispersion	cm³/	: 2.5
>	1000s	: (4.0)

3rd temperature-conditioning		
revolution	1/min	: 2000
Checkbk. volt	mV	: 2500
Output		
temperature	°C	: 61
Speed	1/min	: 500
Checkbk. volt	mV	: 2430
Measuring		
temperature	°C	: 57
Fuel delivery	cm³/	: 53.7...56.3
>	1000s	: (53.0...57.0)
Dispersion	cm³/	: 3.0
>	1000s	:

Idle delivery:		
1st temperature-conditioning		
revolution	1/min	: 2000
Checkbk. volt	mV	: 2500
Output		
temperature	°C	: 61
Speed	1/min	: 340
Checkbk. volt	mV	: 1860
Meßtemperatur	°C	: 57
Fuel delivery	cm³/	: 13.0...17.0
>	1000s	: (12.0...18.0)
Solenoid valve		
Start of		
injection, volts		: 12
Dispersion	cm³/	: 3.0
>	1000s	: (4.0)

Starting fuel delivery:		
1st temperature-conditioning		
revolution	1/min	: 2000
Checkbk. volt	mV	: 2500
Output		
temperature	°C	: 65
Speed	1/min	: 100
Checkbk. volt	mV	: 2880
Measuring		
temperature	°C	: 61
Fuel delivery	cm³/	: 65.0...79.0
>	1000s	: (61.0...83.0)
Solenoid valve		
Start of		
injection, volts		: 12

Stop test:		
Speed	1/min	: 1000
Checkbk. volt	mV	: 4020
ELAB	volts	: 0
Fuel delivery	cm³/	:
max.	1000s	: 3.0
Start of		

Shutoff solenoid:		
Cut-in voltage		
min.> volts		: 10.0
Rated voltage,		
	volts	: 12.0

Notes:
High-pressure compressor sensor
Testing only possible with ballast
EPS 910

Take note of test instructions
"Distributor pump for direct
injectors"!

Dimensions for mounting and setting:

Description		
K	mm	:
KF	mm	: 8.2...8.6
SVS max.	mm	:
FH	mm	:
TS		: 1 467 010 495

A16

A16

BOSCH INJECTION PUMP TEST SPECIFICATIONS

Obsereve notes in remark colum

Test sheet	: VW
Date of manufacture	:
Edition	: 12.06.1996
Replaces	:
Test oil	: ISO 4113
Injection pump	: VE5/11E1750L550
Type No.	: 0 460 415 996
Customer Ident.No.	:

Customer-specific details

Customer	: VW
Engine	: 2.5 TDI
Output kW	:
Speed 1/min	:

TEST BENCH PREREQUISITES

Inlet pressure, bar	: 0.30...0.40
Calibrating nozzle-holder assembly >	: 1 688 901 114
Opening pressure > bar	: 207...210
Test pressure line	: 1 680 750 085
Outer diameter	: 6.00
x wall thickness >	: 2.20
x length > mm	: 350
Overflow valve	: 2 467 413 018
Test line (fuel-delivery actuator)	: 0 986 612 439 : (KDEP 1865/10)
Test line (solenoid valve start of injection)	: 0 986 611 983 : (KDEP 1190)

TEST PRECONDITIONS

Test oil return temp. > °C with thermometer	: 55
Test oil supply temperature > °C	: 42...47
Hold-up revolutions >1/min	: 1200
Feedback voltage mV	: 2500

ELECTRICAL TEST

Actuator
Connections 5 and 6
Test temperature:

15°...30°C, ohms	: 0.4...1.0
50°...70°C, ohms	: 0.45...1.1
Connections 5 and. ground, Mohms min.	: 1.0
Connections 6 and ground, Mohms min.	: 1.0
Connections 3 and 5 Mohms min.	: 1.0
Connections 6 and 7 Mohms min.	: 1.0

High-pressure compressor sensor
Sensor coils

Connections 1 and 2 Ohms	: 4.9...6.5
Connections 2 and 3 Ohms	: 4.9...6.5
Connections 1 and 3 Ohms	: 9.8...13.0
Connections 1 and. ground, Mohms min.	: 1.0
Connections 2 and ground, Mohms min.	: 1.0
Connections 3 and ground, Mohms min.	: 1.0

Temperature sensor, fuel
Connentions 4 and 7
Test temperature:

15°...30°C, kohms	: 1.2...4.0
50°...70°C, kohms	: 0.3...1.2
Connections 4 and ground, Mohms min.	: 1.0
Connections 7 and ground Mohms min.	: 1.0

Solenoid valve, start of injection
Connections 1 and 2
Test temperature :

15°...30°C, ohms	: 14.3...17.3
50°...70°C, ohms	: 15.5...21.0
Starting stop mV	: 4120...4650
Shutoff stop mV	: 650...850

A17

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Setting values of injection pump
Check values in brackets

Supply pump pressure:

Speed	1/min	: 750
Checkbk. volt. mV		: 3900
Setting value, bar		: 6.0...7.0

Timing device travel:

Speed	1/min	: 750
Checkbk. volt mV		: 3900
Setting value, mm		: 8.5...8.7

Full-load delivery :

1st temperature-conditioning revolution	1/min	: 2000
Checkbk. volt mV		: 2500
Output temperature °C		: 61
Speed	1/min	: 750
Checkbk. volt mV		: 2400
Measuring temperature °C		: 57
Fuel delivery	cm^3/ 1000s	: 36.4...36.8
Dispersion >	cm^3/ 1000s	: 2.5 :

Test specifications of injection pump
Check values in brackets

Supply pump pressure variations:

1st speed	1/min	: 1750
Checkbk. volt mV		: 3670
Supply pump pressure >	bar	: 7.4...8.4
>	bar	:

Timing device variations:

1st speed	1/min	: 500
Checkbk. volt. mV		: 3900
Timing device travel	mm	: 6.6...9.0
>	mm	: (6.3...9.3)
2nd speed	1/min	: 1750
Checkbk. volt. mV		: 3670
Timing device travel	mm	: 11.6...12.6
>	mm	: (11.5...12.7)
3rd speed	1/min	: 1200
Checkbk. volt. mV		: 1800
Timing device travel	mm	: max. 0.3
>	mm	: (max. 2.5)
Solenoid valve Start of injection, volts		: 12
4.th speed	1/min	: 750
Checkbk. volt. mV		: 3900
Timing device travel	mm	:
>	mm	: (7.4...9.8)

Overflow at overflow valve:

1st temperature-conditioning revolution	1/min	: 100
Checkbk. volt. mV		: 2500
Output temperature °C		: 51
Speed	1/min	: 1750
Checkbk. volt. mV		: 3670
Measuring temperature °C		: 53
Overflow		: 97...208
>	cm^3/10s	:

A18

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Fuel delivery variations:

1st temperature-conditioning
revolution 1/min : 100
Checkbk. volt mV : 2500
Output
temperature °C : 51
Speed 1/min : 1750
Checkbk. volt mV : 3670
Meßtemperatur °C : 53
Fuel delivery cm³/ : 52.3...54.9
> 1000s : (51.6...55.6)
Dispersion cm³/ : 3.0
> 1000s. : (3.0)

2nd temperature-conditioning
revolution 1/min : 100
Checkbk. volt mV : 2500
Output
temperature °C : 51
Speed 1/min : 1500
Checkbk. volt mV : 3730
Measuring
temperature °C : 53
Fuel delivery cm³/ : 59.2...62.2
> 1000s : (57.9...63.5)
Dispersion cm³/ : 3.5
> 1000s : (3.5)

3rd temperature-conditioning
revolution 1/min : 100
Checkbk. volt mV : 2500
Output
temperature °C : 51
Speed 1/min : 1000
Checkbk. volt mV : 3210
Measuring
temperature °C : 53
Fuel delivery cm³/ : 55.9...58.5
> 1000s : (55.2...59.2)
Dispersion cm³/ : 2.0
> 1000s : (2.5)

4th temperature-conditioning
revolution 1/min : 2000
Checkbk. volt mV : 2500
Output
temperature °C : 61
Speed 1/min : 750
Checkbk. volt mV : 2400
Measuring
temperature °C : 57
Fuel delivery cm³/ :
> 1000s : (35.3...37.9)
Dispersion cm³/ :
> 1000s : (2.5)

5th temperature-conditioning
revolution 1/min : 2000
Checkbk. volt mV : 2500
Output
temperature °C : 61
Speed 1/min : 500
Checkbk. volt mV : 2320
Measuring
temperature °C : 57
Fuel delivery cm³/ : 39.5...42.1
> 1000s : (38.8...42.8)
Dispersion cm³/ : 3.0
> 1000s : (3.0)

Idle delivery:
1st temperature-conditioning
revolution 1/min : 2000
Checkbk. volt mV : 2500
Output
temperature °C : 61
Speed 1/min : 500
Checkbk. volt mV : 1520
Meßtemperatur °C : 57
Fuel delivery cm³/ : 6.9...10.9
> 1000s : (6.9...11.9)
Solenoid valve
Start of
injection, volts : 12
Dispersion cm³/ : 3.0
> 1000s : (4.0)

Starting fuel delivery:
1st temperature-conditioning
revolution 1/min : 2000
Checkbk. volt mV : 2500
Output
temperature °C : 65
Speed 1/min : 100
Checkbk. volt mV : 2960
Measuring
temperature °C : 61
Fuel delivery cm³/ : 74.0...86.0
> 1000s : (69.0...91.0)
Solenoid valve
Start of
injection, volts : 12

Stop test:
Speed 1/min : 1000
Checkbk. volt mV : 2460
ELAB volts : 0
Fuel delivery cm³/ :
max. 1000s : 5.0

Speed 1/min : 1500
Checkbk. volt mV : 4100
ELAB volts : 0
Fuel delivery cm³/ :
max. 1000s : 3.0
Solenoid valve
Start of
injection, volts : 12

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Shutoff solenoid:
Cut-in voltage
min.> volts : 10.0
Rated voltage,
volts : 12.0

Notes:
High-pressure compressor sensor
Testing only possible with ballast
EPS 910

Take note of test instructions
"Distributor pump for direct
injectors"!

Dimensions for mounting and setting:

Description		
K	mm	: 2.7...2.9
KF	mm	: 6.5...6.9
SVS max.	mm	:
FH	mm	:
TS		: 1 467 010 494

A20

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BOSCH INJECTION PUMP TEST SPECIFICATIONS

Obsereve notes in remark colum

Test sheet	: Volvo PENTA
Date of manufacture	:
Edition	: 21.04.1997
Replaces	:
Test oil	: ISO 4113
Injection pump	: VE6/12E1900L749
Type No.	: 0 460 426 998
Customer Ident.No.	:

Customer-specific details

Customer	: VOLVO PENTA
Engine	: KAD 43
Output kW	:
Speed 1/min	:

TEST BENCH PREREQUISITES

Inlet pressure, bar	: 0.30...0.40
Calibrating nozzle-holder assembly >	: 1 688 901 116
Opening pressure > bar	: 207...210
Test pressure line	: 1 680 750 085
Outer diameter	: 6.00
x wall thickness >	: 2.20
x length > mm	: 350
Overflow valve	:
Test line (fuel-delivery actuator)	: 0 986 612 442
Test line (solenoid valve start of injection)	: 1 687 011 208 (Test cable set)

ELECTRICAL TEST

Actuator
Connections 4 and 7
Test temperature:

15°...30°C, ohms	: 0.4...1.0
50°...70°C, ohms	: 0.45...1.1
Connections 4 and. ground, Mohms min.	: 1.0
Connections 7 and ground, Mohms min.	: 1.0
Connections 2 and 7 Mohms min.	: 1.0
Connections 4 and 6 Mohms min.	: 1.0

High-pressure compressor sensor
Sensor coils

Connections 1 and 3 Ohms	: 4.9...6.5
Connections 2 and 3 Ohms	: 4.9...6.5
Connections 1 and 2 Ohms	: 9.8...13.0
Connections 1 and. ground, Mohms min.	: 1.0
Connections 2 and ground, Mohms min.	: 1.0
Connections 3 and ground, Mohms min.	: 1.0

Temperature sensor, fuel
Connentions 5 and 6
Test temperature:

15°...30°C, kohms	: 1.2...4.0
50°...70°C, kohms	: 0.3...1,2
Connections 5 and ground, Mohms min.	: 1.0
Connections 6 and ground Mohms min.	: 1.0

Solenoid valve, start of injection
Connections 1 and 2
Test temperature :

15°...30°C, ohms	: 14.3...17.3
50°...70°C, ohms	: 15.5...21.0
Starting stop mV	: 4120...4650
Shutoff stop mV	: 650...850

A21

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Setting values of injection pump
Check values in brackets

Supply pump pressure:
Speed 1/min : 800
Checkbk. volt.
mV : 2610
Setting value, bar : 7.2...7.4

Timing device travel:
Speed 1/min : 800
Checkbk. volt
mV : 2610
Setting value, mm : 7.7...8.7

Full-load delivery :
speed 1/min : 800
Checkbk. volt
mV : 2610
Fuel delivery cm^3/
> 1000s : 64.2...64.6
Dispersion cm^3/ : 5.0
> 1000s :

Test specifications of injection pump
Check values in brackets

Supply pump pressure variations:

1st speed 1/min : 1900
Checkbk. volt
mV : 3500
Supply pump
pressure > bar : 7.9...8.9
> bar :

2st speed 1/min : 500
Checkbk. volt
mV : 2730
Supply pump
pressure > bar : 5.5...7.9
> bar :

Timing device variations:

1st speed 1/min : 200
Checkbk. volt. mV : 2500
Timing device
travel mm : 5.9...9.9
> mm : (5.4...10.4)

2nd speed 1/min : 800
Checkbk. volt. mV : 2610
Timing device
travel mm :
> mm : (7.5...8.9)

3rd speed 1/min : 1000
Checkbk. volt. mV : 1660
Timing device
travel mm : max. 0.6
> mm : (max. 0.8)
Solenoid valve
Start of
injection, volts : 12

4.th speed 1/min : 200
Checkbk. volt. mV : 2500
Timing device
travel mm : 5.9...9.9
> mm : (5.4...10.4)

Overflow at overflow valve:

speed 1/min : 1900
Checkbk. volt. mV : 3500
Overflow : 83...167
> cm^3/10s :

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Fuel delivery variations:

1st Speed	1/min	: 1900
Checkbk. volt	mV	: 3500
Fuel delivery	cm³/	: 78.7...82.3
>	1000s	: (77.0...84.0)
Dispersion	cm³/	:
>	1000s.	:
1nd Speed	1/min	: 800
Checkbk. volt	mV	: 2610
Fuel delivery	cm³/	:
>	1000s	: (61.9...66.9)
Dispersion	cm³/	:
>	1000s	: (5.9)
3rd Speed	1/min	: 500
Checkbk. volt	mV	: 2730
Fuel delivery	cm³/	: 80.2...83.2
>	1000s	: (78.7...84.7)
Dispersion	cm³/	:
>	1000s	:

Idle delivery:

Speed	1/min	: 400
Checkbk. volt	mV	: 1900
Fuel delivery	cm³/	: 18.2...24.2
>	1000s	: (16.2...26.2)
Solenoid valve		
Start of		
injection, volts		: 12
Dispersion	cm³/	: 5.0
>	1000s	: (5.0)

Starting fuel delivery:

Speed	1/min	: 100
Checkbk. volt	mV	: 2830
Fuel delivery	cm³/	: 60.0...82.0
>	1000s	: (51.0...91.0)
Solenoid valve		
Start of		
injection, volts		: 12

Stop test:

Speed	1/min	: 1600
Checkbk. volt	mV	: 4000
ELAB	volts	: 0
Fuel delivery	cm³/	:
max.	1000s	: (max. 3.0)

Shutoff solenoid:

Cut-in voltage	
min.> volts	: 10,0
Rated voltage,	
volts	: 12,0

Dimensions for mounting and setting:

Description		
K	mm	: 2.7...2.9
KF	mm	: 8.2...8.6
SVS max.	mm	:
FH	mm	:
TS		: 1 467 010 495

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BOSCH INJECTION PUMP TEST SPECIFICATIONS

Obsereve notes in remark colum

Test sheet	: VM
Date of manufacture	:
Edition	: 16.12.1996
Replaces	:
Test oil	: ISO 4113
Injection pump	: VE6/12E1900L719
Type No.	: 0 460 426 999
Customer Ident.No.	:

Customer-specific details

Customer	: VM-Motori
Engine	: D 706 LIM
Output kW	:
Speed 1/min	:

TEST BENCH PREREQUISITES

Inlet pressure, bar	: 0.30...0.40
Calibrating nozzle-holder assembly >	: 1 688 901 116
Opening pressure > bar	: 207...210
Test pressure line	: 1 680 750 085
Outer diameter	: 6.00
x wall thickness >	: 2.20
x length > mm	: 350
Overflow valve	: 2 467 413 018
Test line (fuel-delivery actuator)	: 0 986 612 442
Test line (solenoid valve start of injection)	: 1 687 011 208 (Test cable set)

TEST PRECONDITIONS

Test oil return temp. > °C with thermometer	: 55
Test oil supply temperature > °C	: 42...47
Hold-up revolutions >1/min	: 1200
Feedback voltage mV	: 2500

ELECTRICAL TEST

Actuator
Connections 4 and 7
Test temperature:

15°...30°C, ohms	: 0.4...1.0
50°...70°C, ohms	: 0.45...1.1
Connections 4 and. ground, Mohms min.	: 1.0
Connections 7 and ground, Mohms min.	: 1.0
Connections 2 and 7 Mohms min.	: 1.0
Connections 4 and 6 Mohms min.	: 1.0

High-pressure compressor sensor
Sensor coils
Connections 1 and 3

Ohms	: 4.9...6.5
Connections 2 and 3 Ohms	: 4.9...6.5
Connections 1 and 2 Ohms	: 9.8...13.0
Connections 1 and. ground, Mohms min.	: 1.0
Connections 2 and ground, Mohms min.	: 1.0
Connections 3 and ground, Mohms min.	: 1.0

Temperature sensor, fuel
Connentions 5 and 6
Test temperature:

15°...30°C, kohms	: 1.2...4.0
50°...70°C, kohms	: 0.3...1.2
Connections 5 and ground, Mohms min.	: 1.0
Connections 6 and ground Mohms min.	: 1.0

Solenoid valve, start of injection
Connections 1 and 2
Test temperature :

15°...30°C, ohms	: 14.3...17.3
50°...70°C, ohms	: 15.5...21.0
Starting stop mV	: 4120...4650
Shutoff stop mV	: 650...850

A24

124

Setting values of injection pump
Check values in brackets

Supply pump pressure:
Speed 1/min : 950
Checkbk. volt.
mV : 3250
Setting value, bar : 7.7...7.9

Timing device travel:
Speed 1/min : 950
Checkbk. volt
mV : 3250
Setting value, mm : 9.3...10.3

Full-load delivery :
1st temperature-conditioning
revolution 1/min : 2000
Checkbk. volt
mV : 2500
Output
temperature °C : 61
Speed 1/min : 750
Checkbk. volt
mV : 1940
Measuring
temperature °C : 57
Fuel delivery cm³/
> 1000s : 36.5...36.9
Dispersion cm³/ : 3.0
> 1000s :

Test specifications of injection pump
Check values in brackets

Supply pump pressure variations:

1st speed 1/min : 1900
Checkbk. volt
mV : 3780
Supply pump
pressure > bar : 8.2...9.6
> bar :

2st speed 1/min : 200
Checkbk. volt
mV : 2230
Supply pump
pressure > bar : 4.9...7.3
> bar :

Timing device variations:

1st speed 1/min : 200
Checkbk. volt. mV : 2230
Timing device
travel mm : 7.0...10.0
> mm : (6.3...10.7)

2nd speed 1/min : 1900
Checkbk. volt. mV : 3780
Timing device
travel mm : 9.1...10.5
> mm : (9.0...10.6)

3rd speed 1/min : 950
Checkbk. volt. mV : 1365
Timing device
travel mm : max. 0.4
> mm : (max. 0.5)
Solenoid valve
Start of
injection, volts : 12

4.th speed 1/min : 950
Checkbk. volt. mV : 3250
Timing device
travel mm :
> mm : (9.0...10.6)

Overflow at overflow valve:

1st temperature-conditioning
revolution 1/min : 100
Checkbk. volt. mV : 2500
Output
temperature °C : 51
Speed 1/min : 1900
Checkbk. volt. mV : 3780
Measuring
temperature °C : 53
Overflow : 83...194
> cm³/10s :

B1

B1

Fuel delivery variations:

1st temperature-conditioning
revolution 1/min : 100
Checkbk. volt mV : 2500
Output
temperature °C : 51
Speed 1/min : 1900
Checkbk. volt mV : 3780
Meßtemperatur °C : 53
Fuel delivery cm³/ : 88.9...93.9
> 1000s : (88.4...94.4)
Dispersion cm³/ :
> 1000s. :

2nd temperature-conditioning
revolution 1/min : 2000
Checkbk. volt mV : 2500
Output
temperature °C : 61
Speed 1/min : 750
Checkbk. volt mV : 1940
Measuring
temperature °C : 57
Fuel delivery cm³/ :
> 1000s : (35.2...38.2)
Dispersion cm³/ :
> 1000s : (3.0)

3rd temperature-conditioning
revolution 1/min : 2000
Checkbk. volt mV : 2500
Output
temperature °C : 61
Speed 1/min : 500
Checkbk. volt mV : 2230
Measuring
temperature °C : 57
Fuel delivery cm³/ : 56.8...60.8
> 1000s : (56.3...61.3)
Dispersion cm³/ :
> 1000s :

Idle delivery:
1st temperature-conditioning
revolution 1/min : 2000
Checkbk. volt mV : 2500
Output
temperature °C : 61
Speed 1/min : 400
Checkbk. volt mV : 1630
Meßtemperatur °C : 57
Fuel delivery cm³/ : 5.0...10.0
> 1000s : (4.5...11.0)
Solenoid valve
Start of
injection, volts : 12
Dispersion cm³/ : 3.0
> 1000s : (3.0)

Starting fuel delivery:
1st temperature-conditioning
revolution 1/min : 2000
Checkbk. volt mV : 2500
Output
temperature °C : 65
Speed 1/min : 100
Checkbk. volt mV : 2760
Measuring
temperature °C : 61
Fuel delivery cm³/ : 68.0...88.0
> 1000s : (66.0...90.0)
Solenoid valve
Start of
injection, volts : 12

Stop test:
Speed 1/min : 1600
Checkbk. volt mV : 4100
ELAB volts : 0
Fuel delivery cm³/ :
max. 1000s : 3.0
Start of

Shutoff solenoid:
Cut-in voltage
min.> volts : 10.0
Rated voltage,
volts : 12.0

Notes:
High-pressure compressor sensor
Testing only possible with ballast
EPS 910

Take note of test instructions
"Distributor pump for direct
injectors"!

Dimensions for mounting and setting:

Description		
K	mm	: 2.7...2.9
KF	mm	: 8.2...8.6
SVS max.	mm	:
FH	mm	:
TS		: 1 467 010 495

B2

BOSCH INJECTION PUMP TEST SPECIFICATIONS

Obsereve notes in remark colum

Test sheet : BMW
Date of manufacture :
Edition : 13.01.1997
Replaces :
Test oil : ISO 4113

Injection pump : VE4/9E2200R576

Type No. : 0 460 494 995
Customer Ident.No. :

Customer-specific details
Customer : BMW

Engine : M41

Output kW :
Speed 1/min :

TEST BENCH PREREQUISITES

Inlet pressure, bar : 0.30...0.40

Calibrating nozzle-
holder assembly > : 1 688 901 022

Opening
pressure > bar : 130...133

Test pressure line : 1 680 750 073

Outer diameter : 6.00
x wall thickness > : 2.00
x length > mm : 450

Overflow valve :

Test line : 0 986 612 443
(fuel-delivery actuator)

Test line : 1 687 011 208
(solenoid valve
start of injection) : (Test cable set)

ELECTRICAL TEST

Actuator
Connections 5 and 6
Test temperature:
15°...30°C, ohms : 0.4...1.0
50°...70°C, ohms : 0.45...1.1

Connections 6 and.
ground, Mohms min. : 1.0
Connections 5 and
ground, Mohms min. : 1.0
Connections 3 and 5
Mohms min. : 1.0
Connections 6 and 7
Mohms min. : 1.0

High-pressure compressor sensor
Sensor coils
Connections 1 and 2
kohms : 4.9...6.5
Connections 2 and 3
kohms : 4.9...6.5
Connections 1 and 3
kohms : 9.8...13.0

Connections 1 and.
ground, Mohms min. : 1.0
Connections 2 and
ground, Mohms min. : 1.0
Connections 3 and
ground, Mohms min. : 1.0

Temperature sensor, fuel
Connentions 4 and 7
Test temperature:
15°...30°C, kohms : 1.2...4.0
50°...70°C, kohms : 0.3...1.2

Connections 4 and
ground, Mohms min. : 1.0
Connections 7 and
ground Mohms min. : 1.0

Solenoid valve, start of injection
Connections 1 and 2
Test temperature :
15°...30°C, ohms : 14.3...17.3
50°...70°C, ohms : 15.5...21.0

Starting stop mV : 4120...4650

Shutoff stop mV : 650...850

B3

B3

Setting values of injection pump
Check values in brackets

Supply pump pressure:

Speed	1/min	: 1500
Checkbk. volt. mV		: 2940
Setting value, bar		: 6.9...8.1

Timing device travel:

Speed	1/min	: 1500
Checkbk. volt mV		: 2940
Setting value, mm		: 11.0...11.2

Full-load delivery :

1st temperature-conditioning revolution	1/min	: 1500
Checkbk. volt mV		: 2940
Fuel delivery cm^3/		
>	1000s	: 47.2...47.6
Dispersion	cm^3/	: 2.0
>	1000s	:

Test specifications of injection pump
Check values in brackets

Supply pump pressure variations:

1st speed	1/min	: 2200
Checkbk. volt mV		: 3100
Supply pump pressure >	bar	: 8.1...9.5
>	bar	:

2st speed	1/min	: 450
Checkbk. volt mV		: 2710
Supply pump pressure >	bar	: 5.1...6.5
>	bar	:

Timing device variations:

1st speed	1/min	: 450
Checkbk. volt. mV		: 2710
Timing device travel	mm	: 7.2...9.0
>	mm	: (6.8...9.4)

2nd speed	1/min	: 1500
Checkbk. volt. mV		: 2940
Timing device travel	mm	:
>	mm	: (10.3...11.9)

3rd speed	1/min	: 1500
Checkbk. volt. mV		: 2940
Timing device travel	mm	: 0.0...0.4
>	mm	: (0.0...1.4)
Solenoid valve Start of injection, volts		: 12

4.th speed	1/min	: 2200
Checkbk. volt. mV		: 3100
Timing device travel	mm	: 12.0...12.6
>	mm	: (11.8...12.8)

Overflow at overflow valve:

Speed	1/min	: 2200
Checkbk. volt. mV		: 3100
Overflow		: 97...180
>	cm^3/10s	:

B4

B4

Fuel delivery variations:

1. Speed	1/min	: 2200
Checkbk. volt	mV	: 3100
Fuel delivery	cm³/	: 51.2...54.2
>	1000s	: (50.2...55.2)
Dispersion	cm³/	: 2,5
>	1000s.	:
2. Speed	1/min	: 1500
Checkbk. volt	mV	: 2940
Fuel delivery	cm³/	:
>	1000s	: (45.6...49.2)
Dispersion	cm³/	:
>	1000s	: (3.0)
3. Speed	1/min	: 1000
Checkbk. volt	mV	: 3060
Fuel delivery	cm³/	: 49.1...52.1
>	1000s	: (48.6...52.6)
Dispersion	cm³/	: 2.0
>	1000s	:
4. Speed	1/min	: 1000
Checkbk. volt	mV	: 2100
Fuel delivery	cm³/	: 14.0...17.0
>	1000s	: (13.5...17.5)
Dispersion	cm³/	: 2,0
>	1000s	:
5. Speed	1/min	: 500
Checkbk. volt	mV	: 2710
Fuel delivery	cm³/	: 30.3...33.3
>	1000s	: (29.8...33.8)
Dispersion	cm³/	: 2.0
>	1000s	:

Idle delivery:

Speed	1/min	: 450
Checkbk. volt	mV	: 2030
Fuel delivery	cm³/	: 3.9...6.9
>	1000s	: (2.9...7.9)
Solenoid valve		
Start of		
injection, volts		: 12
Dispersion	cm³/	: 2.0
>	1000s	: (3.0)

Starting fuel delivery:

Speed	1/min	: 100
Checkbk. volt	mV	: 4020
Fuel delivery	cm³/	: 59.9...75.7
>	1000s	: (58.9...76.7)
Solenoid valve		
Start of		
injection, volts		: 12

Stop test:

Speed	1/min	: 500
Checkbk. volt	mV	: 2710
ELAB	volts	: 0
Fuel delivery	cm³/	:
max.	1000s	: 3,0

Shutoff solenoid:

Cut-in voltage		
min.> volts		: 10.0
Rated voltage,		
	volts	: 12.0

Dimensions for mounting and setting:

Description		
K	mm	:
KF	mm	:
SVS max.	mm	:
FH	mm	:

B5

BOSCH INJECTION PUMP TEST SPECIFICATIONS

Obsereve notes in remark colum

Test sheet	: IVECO
Date of manufacture	:
Edition	: 13.08.1993
Replaces	:
Test oil	: ISO 4113
Injection pump	: VE4/9E2100R570
Type No.	: 0 460 494 996
Customer Ident.No.	:

Customer-specific details

Customer	: IVECO
Engine	: Sofim
	: 8144.97.2580
Output kW	:
Speed 1/min	:

TEST BENCH PREREQUISITES

Inlet pressure, bar	: 0.30...0.40
Calibrating nozzle-holder assembly >	: 1 688 901 022
Opening pressure > bar	: 130...133
Test pressure line	: 1 680 750 073
Outer diameter	: 6.00
x wall thickness >	: 2.00
x length > mm	: 450
Overflow valve	:
Overflow valve	:
Test line (fuel-delivery actuator)	: 0 986 612 434
Test line (solenoid valve start of injection):	: 0 986 612 435

ELECTRICAL TEST

Actuator
Connections 4 and 7
Test temperature:

15°...30°C, ohms	: 0.4...1.0
50°...70°C, ohms	: 0.45...1.1
Connections 4 and. ground, Mohms min.	: 1.0
Connections 7 and ground, Mohms min.	: 1.0
Connections 2 and 7 Mohms min.	: 1.0
Connections 4 and 6 Mohms min.	: 1.0

High-pressure compressor sensor
Sensor coils

Connections 1 and 3 kohms	: 4.9...6.5
Connections 2 and 3 kohms	: 4.9...6.5
Connections 1 and 2 kohms	: 9.8...13.0
Connections 1 and. ground, Mohms min.	: 1.0
Connections 2 and ground, Mohms min.	: 1.0
Connections 3 and ground, Mohms min.	: 1.0

Temperature sensor, fuel
Connentions 5 and 6
Test temperature:

15°...30°C, kohms	: 1.2...4.0
50°...70°C, kohms	: 0.3...1.2
Connections 5 and ground, Mohms min.	: 1.0
Connections 6 and ground Mohms min.	: 1.0

Solenoid valve, start of injection
Connections 1 and 2
Test temperature :

15°...30°C, ohms	: 14.3...17.3
50°...70°C, ohms	: 15.5...21.0
Starting stop mV	: 4120...4650
Shutoff stop mV	: 650...850

B6

B6

Setting values of injection pump
Check values in brackets

Supply pump pressure:
Speed 1/min : 1000
Checkbk. volt.
mV : 3400
Setting value, bar : 5.8...6.6

Timing device travel:
Speed 1/min : 1000
Checkbk. volt
mV : 3400
Setting value, mm : 9.2...9.4

Full-load delivery :
1st temperature-conditioning
revolution 1/min : 1500
Checkbk. volt
mV : 3400
Fuel delivery cm^3/
> 1000s : 67.4...67.8
Dispersion cm^3/ : 2.0
> 1000s :

Test specifications of injection pump
Check values in brackets

Supply pump pressure variations:

1st speed 1/min : 2100
Checkbk. volt
mV : 3400
Supply pump
pressure > bar : 7.4...8.2
> bar :

2st speed 1/min : 500
Checkbk. volt
mV : 3400
Supply pump
pressure > bar : 5.1...5.9
> bar :

3st speed 1/min : 150
Checkbk. volt
mV : 3400
Supply pump
pressure > bar : min. 3.5
> bar :

Timing device variations:

1st speed 1/min : 500
Checkbk. volt. mV : 3400
Timing device
travel mm : 6.8...8.2
> mm : (6.3...8.7)

2nd speed 1/min : 1000
Checkbk. volt. mV : 3400
Timing device
travel mm :
> mm : (8.3...10.3)

3rd speed 1/min : 2100
Checkbk. volt. mV : 3400
Timing device
travel mm : 11.9...12.7
> mm : (11.8...12.8)

4.th speed 1/min : 1000
Checkbk. volt. mV : 2200
Timing device
travel mm : max. 0.5
> mm : (max. 0.6
Solenoid valve
Start of
injection, volts : 12

Overflow at overflow valve:

Speed 1/min : 2100
Checkbk. volt. mV : 3400
Overflow : 83...166
> cm^3/10s :

Fuel delivery variations:

1. Speed	1/min	: 2100
Checkbk. volt	mV	: 3400
Fuel delivery	cm³/	: 62.2...66.2
>	1000s	: (61.2...67.2)
Dispersion	cm³/	: 3.0
>	1000s.	:
2. Speed	1/min	: 1500
Checkbk. volt	mV	: 3400
Fuel delivery	cm³/	:
>	1000s	: (65.6...69.6)
Dispersion	cm³/	:
>	1000s	:
3. Speed	1/min	: 1000
Checkbk. volt	mV	: 3400
Fuel delivery	cm³/	: 62.3...64.7
>	1000s	: (61.5...65.5)
Dispersion	cm³/	: 2.0
>	1000s	: (3.0)
4. Speed	1/min	: 500
Checkbk. volt	mV	: 3400
Fuel delivery	cm³/	: 51.8...55.4
>	1000s	: (51.3...55.9)
Dispersion	cm³/	: 2.5
>	1000s	:

Idle delivery:

Speed	1/min	: 450
Checkbk. volt	mV	: 2350
Fuel delivery	cm³/	: 11.2...14.8
>	1000s	: (10.5...15.5)
Solenoid valve Start of injection, volts		: 12
Dispersion	cm³/	: 2.5
>	1000s	: (3.0)

Starting fuel delivery:

Speed	1/min	: 100
Checkbk. volt	mV	: 3400
Fuel delivery	cm³/	:
>	1000s	: (42.0...54.0)
Solenoid valve Start of injection, volts		: 12

Stop test:

Speed	1/min	: 750
Checkbk. volt	mV	: 3400
ELAB	volts	: 0
Fuel delivery	cm³/	:
max.	1000s	: (4.0)

Shutoff solenoid:

Cut-in voltage min.> volts	: 10.0
Rated voltage, volts	: 12.0

Dimensions for mounting and setting:

Description		
K	mm	:
KF	mm	:
SVS max.	mm	:
FH	mm	:

B8

BOSCH INJECTION PUMP TEST SPECIFICATIONS

Obsereve notes in remark colum

Test sheet	: FIAT
Date of manufacture	:
Edition	: 01.07.1994
Replaces	:
Test oil	: ISO 4113
Injection pump	: VE5/9E2250R560
Type No.	: 0 460 495 998
Customer Ident.No.	:

Customer-specific details

Customer	: FIAT
Engine	: M717 AT 24.C
Output kW	:
Speed 1/min	:

TEST BENCH PREREQUISITES

Inlet pressure, bar	: 0.30...0.40
Calibrating nozzle-holder assembly >	: 1 688 901 022
Opening pressure > bar	: 130...133
Test pressure line	: 1 680 750 073
Outer diameter	: 6.00
x wall thickness >	: 2.00
x length > mm	: 450
Overflow valve	:
Test line (fuel-delivery actuator)	: 0 986 612 434
Test line (solenoid valve start of injection):	: 0 986 612 435

ELECTRICAL TEST

Actuator
Connections 4 and 7
Test temperature:

15°...30°C, ohms	: 0.4...1.0
50°...70°C, ohms	: 0.45...1.1
Connections 4 and. ground, Mohms min.	: 1.0
Connections 7 and ground, Mohms min.	: 1.0
Connections 2 and 7 Mohms min.	: 1.0
Connections 4 and 6 Mohms min.	: 1.0

High-pressure compressor sensor
Sensor coils

Connections 1 and 3 kohms	: 4.9...6.5
Connections 2 and 3 kohms	: 4.9...6.5
Connections 1 and 2 kohms	: 9.8...13.0
Connections 1 and. ground, Mohms min.	: 1.0
Connections 2 and ground, Mohms min.	: 1.0
Connections 3 and ground, Mohms min.	: 1.0

Temperature sensor, fuel
Connentions 5 and 6
Test temperature:

15°...30°C, kohms	: 1.2...4.0
50°...70°C, kohms	: 0.3...1.2
Connections 5 and ground, Mohms min.	: 1.0
Connections 6 and ground Mohms min.	: 1.0

Solenoid valve, start of injection
Connections 1 and 2
Test temperature :

15°...30°C, ohms	: 14.3...17.3
50°...70°C, ohms	: 15.5...21.0
Starting stop mV	: 4120...4650
Shutoff stop mV	: 650...850

B9

Setting values of injection pump
Check values in brackets

Supply pump pressure:

Speed	1/min	: 1250
Checkbk. volt. mV		: 3000
Setting value, bar		: 6.6...7.4

Timing device travel:

Speed	1/min	: 1250
Checkbk. volt mV		: 3000
Setting value, mm		: 7.3...7.5

Full-load delivery :

1st temperature-conditioning revolution	1/min	: 1250
Checkbk. volt mV		: 2310
Fuel delivery	cm³/ 1000s	: 34.3...34.7
Dispersion >	cm³/ 1000s	: 2.0 :

Test specifications of injection pump
Check values in brackets

Supply pump pressure variations:

1st speed	1/min	: 2250
Checkbk. volt mV		: 3000
Supply pump pressure >	bar	: 8.4...9.2
>	bar	:

2st speed	1/min	: 500
Checkbk. volt mV		: 3000
Supply pump pressure >	bar	: 5.5...6.3
>	bar	:

Timing device variations:

1st speed	1/min	: 500
Checkbk. volt. mV		: 3000
Timing device travel	mm	: 5.2...6.4
>	mm	: (4.8...6.8)

2nd speed	1/min	: 1250
Checkbk. volt. mV		: 3000
Timing device travel	mm	:
>	mm	: (6.6...8.2)

3rd speed	1/min	: 2250
Checkbk. volt. mV		: 3000
Timing device travel	mm	: 9.5...10.1
>	mm	: (9.4...10.2)

4.th speed	1/min	: 2250
Checkbk. volt. mV		: 1850
Timing device travel	mm	: max. 2.0
>	mm	: (max. 3.0)
Solenoid valve Start of injection,	volts	: 12

Overflow at overflow valve:

Speed	1/min	: 2250
Checkbk. volt. mV		: 3000
Overflow		: 69...125
>	cm³/10s	:

Fuel delivery variations:

1. Speed	1/min	: 2250
Checkbk. volt	mV	: 3000
Fuel delivery	cm³/	: 62.1...64.7
>	1000s	: (61.4...65.4)
Dispersion	cm³/	: 2,0
>	1000s.	:
2. Speed	1/min	: 1250
Checkbk. volt	mV	: 2310
Fuel delivery	cm³/	:
>	1000s	: (33.0...36.0)
Dispersion	cm³/	:
>	1000s	:
3. Speed	1/min	: 500
Checkbk. volt	mV	: 3000
Fuel delivery	cm³/	: 51.5...55.5
>	1000s	: (50.7...55.3)
Dispersion	cm³/	: 2.0
>	1000s	:

Idle delivery:

Speed	1/min	: 400
Checkbk. volt	mV	: 1850
Fuel delivery	cm³/	: 4.5...7.5
>	1000s	: (3.7...8.3)
Solenoid valve Start of injection, volts		: 12
Dispersion	cm³/	: 2.0
>	1000s	: (3.0)

Starting fuel delivery:

Speed	1/min	: 100
Checkbk. volt	mV	: 3290
Fuel delivery	cm³/	: 51.0...61.0
>	1000s	: (48.0...64.0)
Solenoid valve Start of injection, volts		: 12

Stop test:

Speed	1/min	: 1000
Checkbk. volt	mV	: 3000
ELAB	volts	: 0
Fuel delivery max.	cm³/ 1000s	: 3,0

Shutoff solenoid:

Cut-in voltage min.> volts	: 10.0
Rated voltage, volts	: 12.0

Dimensions for mounting and setting:

Description		
K	mm	: 3.2...3.4
KF	mm	:
SVS max.	mm	:
FH	mm	:

BOSCH INJECTION PUMP TEST SPECIFICATIONS

Obsereve notes in remark colum

Test sheet	:	IVECO
Date of manufacture	:	
Edition	:	19.01.1994
Replaces	:	
Test oil	:	ISO 4113
Injection pump	:	VE4/11E1900R565
Type No.	:	0 460 414 996
Customer Ident.No.	:	

Customer-specific details

Customer	:	IVECO
Engine	:	840.47.2790
Output kW	:	
Speed 1/min	:	

TEST BENCH PREREQUISITES

Inlet pressure, bar	:	0.30...0.40
Calibrating nozzle-holder assembly >	:	1 688 901 116
Opening pressure > bar	:	207...210
Test pressure line	:	1 680 750 073
Outer diameter	:	6.00
x wall thickness >	:	2.00
x length > mm	:	450
Overflow valve	:	2 467 413 006
Test line (fuel-delivery actuator)	:	0 986 612 434
Test line (solenoid valve start of injection)	:	0 986 612 435

TEST PRECONDITIONS

Test oil return temp. > °C with thermometer	:	45
Test oil supply temperature > °C	:	35...40
Hold-up revolutions >1/min	:	1100
Feedback voltage mV	:	2500

ELECTRICAL TEST

Actuator
Connections 4 and 7
Test temperature:

15°...30°C, ohms	:	0.4...1.0
50°...70°C, ohms	:	0.45...1.1
Connections 4 and. ground, Mohms min.	:	1.0
Connections 7 and ground, Mohms min.	:	1.0
Connections 2 and 7 Mohms min.	:	1.0
Connections 4 and 6 Mohms min.	:	1.0

High-pressure compressor sensor
Sensor coils
Connections 1 and 3

Ohms	:	4.9...6.5

Connections 2 and 3

Ohms	:	4.9...6.5

Connections 1 and 2

Ohms	:	9.8...13.0
Connections 1 and. ground, Mohms min.	:	1.0
Connections 2 and ground, Mohms min.	:	1.0
Connections 3 and ground, Mohms min.	:	1.0

Temperature sensor, fuel
Connentions 5 and 6
Test temperature:

15°...30°C, kohms	:	1.2...4.0
50°...70°C, kohms	:	0.3...1.2
Connections 5 and ground, Mohms min.	:	1.0
Connections 6 and ground Mohms min.	:	1.0

Solenoid valve, start of injection
Connections 1 and 2
Test temperature :

15°...30°C, ohms	:	14.3...17.3
50°...70°C, ohms	:	15.5...21.0
Starting stop mV	:	4120...4650
Shutoff stop mV	:	650...850

B12

Setting values of injection pump
Check values in brackets

Supply pump pressure:
Speed 1/min : 500
Checkbk. volt.
mV : 1950
Setting value, bar : 6.5...7.3

Timing device travel:
Speed 1/min : 500
Checkbk. volt
mV : 1950
Setting value, mm : 9.30...9.50

Full-load delivery :
1st temperature-conditioning
revolution 1/min : 1900
Checkbk. volt
mV : 2500
Output
temperature °C : 48
Speed 1/min : 750
Checkbk. volt
mV : 2050
Measuring
temperature °C : 46
Fuel delivery cm³/
> 1000s : 39.2...40.2
Dispersion cm³/ : 2.5
> 1000s :

Test specifications of injection pump
Check values in brackets

Supply pump pressure variations:

1st speed 1/min : 1900
Checkbk. volt
mV : 3500
Supply pump
pressure > bar : 8.4...9.2
> bar :

Timing device variations:

1st speed 1/min : 750
Checkbk. volt. mV : 2050
Timing device
travel mm : 9.4...11.4
> mm : (8.9...11.9)

2nd speed 1/min : 500
Checkbk. volt. mV : 1950
Timing device
travel mm :
> mm : (8.7...9.7)

3rd speed 1/min : 1900
Checkbk. volt. mV : 3500
Timing device
travel mm : 10.8...12.0
> mm : (10.6...12.2

4.th speed 1/min : 1300
Checkbk. volt. mV : 1850
Timing device
travel mm : max. 1.2
> mm : (max. 3.5)
Solenoid valve
Start of
injection, volts : 12

Overflow at overflow valve:

1st temperature-conditioning
revolution 1/min : 100
Checkbk. volt. mV : 2500
Output
temperature °C : 41
Speed 1/min : 1900
Checkbk. volt. mV : 3500
Measuring
temperature °C : 43
Overflow : 83...167
> cm³/10s :

B13

Fuel delivery variations:

1st temperature-conditioning		
revolution	1/min	: 100
Checkbk. volt	mV	: 2500
Output		
temperature	°C	: 41
Speed	1/min	: 1900
Checkbk. volt	mV	: 3500
Meßtemperatur	°C	: 43
Fuel delivery	cm³/	: 65.4...68.0
>	1000s	: (64.4...69.0)
Dispersion	cm³/	:
>	1000s.	:
2nd temperature-conditioning		
revolution	1/min	: 1900
Checkbk. volt	mV	: 2500
Output		
temperature	°C	: 45
Speed	1/min	: 1185
Checkbk. volt	mV	: 2170
Measuring		
temperature	°C	: 45
Fuel delivery	cm³/	: 36.2...38.8
>	1000s	: (35,2...39.8)
Dispersion	cm³/	: 2.5
>	1000s	:
3rd temperature-conditioning		
revolution	1/min	: 2000
Checkbk. volt	mV	: 2500
Output		
temperature	°C	: 61
Speed	1/min	: 750
Checkbk. volt	mV	: 2050
Measuring		
temperature	°C	: 57
Fuel delivery	cm³/	:
>	1000s	: (38.2...41.2)
Dispersion	cm³/	:
>	1000s	:
4rd temperature-conditioning		
revolution	1/min	: 1900
Checkbk. volt	mV	: 2500
Output		
temperature	°C	: 45
Speed	1/min	: 900
Checkbk. volt	mV	: 2900
Measuring		
temperature	°C	: 45
Fuel delivery	cm³/	: 69.0...71.4
>	1000s	: (68.2...72.2)
Dispersion	cm³/	: 2.5
>	1000s	: (3.0)

Idle delivery:

1st temperature-conditioning		
revolution	1/min	: 1900
Checkbk. volt	mV	: 2500
Output		
temperature	°C	: 51
Speed	1/min	: 500
Checkbk. volt	mV	: 1360
Meßtemperatur	°C	: 49
Fuel delivery	cm³/	: 9.9...14.9
>	1000s	: (8.9...15.9)
Solenoid valve		
Start of		
injection, volts		: 12
Dispersion	cm³/	: 3.0
>	1000s	: (4.0)

Starting fuel delivery:

1st temperature-conditioning		
revolution	1/min	: 1900
Checkbk. volt	mV	: 2500
Output		
temperature	°C	: 51
Speed	1/min	: 100
Checkbk. volt	mV	: 2870
Measuring		
temperature	°C	: 49
Fuel delivery	cm³/	: 67.0
>	1000s	:
Solenoid valve		
Start of		
injection, volts		: 12

Stop test:

Speed	1/min	: 1100
Checkbk. volt	mV	: 3500
ELAB	volts	: 0
Fuel delivery	cm³/	:
max.	1000s	: 3.0
Start of		

Shutoff solenoid:

Cut-in voltage		
min.> volts		: 10.0
Rated voltage,		
	volts	: 12.0

Dimensions for mounting and setting:

Description		
K	mm	:
KF	mm	: 6.2...6.6
SVS max.	mm	:
FH	mm	:
TS		: 1 467 010 410

B14

BOSCH INJECTION PUMP TEST SPECIFICATIONS

Obsereve notes in remark colum

Test sheet	: Chrysler
Date of manufacture	:
Edition	: 17.07.1996
Replaces	:
Test oil	: ISO 4113
Injection pump	: VE4/10E2100R707
Type No.	: 0 460 404 975
Customer Ident.No.	:

Customer-specific details

Customer	: Chrysler
Engine	: 424 CLIEE
Output kW	:
Speed 1/min	:

TEST BENCH PREREQUISITES

Inlet pressure, bar	: 0.30...0.40
Calibrating nozzle-holder assembly >	: 1 688 901 022
Opening pressure > . bar	: 130...133
Test pressure line	: 1 680 750 073
Outer diameter	: 6.00
x wall thickness >	: 2.00
x length > mm	: 450
Overflow valve	: 2 467 413 018
Test line (fuel-delivery actuator)	: 0 986 612 445
Test line (solenoid valve start of injection)	: 1 687 011 208 (Test cable set)

ELECTRICAL TEST

Actuator
Connections 8 and 9
Test temperature:

15°...30°C, ohms	: 0.4...1.0
50°...70°C, ohms	: 0.45...1.1
Connections 8 and. ground, Mohms min.	: 1.0
Connections 9 and ground, Mohms min.	: 1.0
Connections 2 and 8 Mohms min.	: 1.0
Connections 7 and 9 Mohms min.	: 1.0

High-pressure compressor sensor
Sensor coils

Connections 1 and 2 kohms	: 4.9...6.5
Connections 3 and 2 kohms	: 4.9...6.5
Connections 1 and 3 kohms	: 9.8...13.0
Connections 1 and. ground, Mohms min.	: 1.0
Connections 2 and ground, Mohms min.	: 1.0
Connections 3 and ground, Mohms min.	: 1.0

Temperature sensor, fuel
Connentions 4 and 7
Test temperature:

15°...30°C, kohms	: 1.2...4.0
50°...70°C, kohms	: 0.3...1.2
Connections 4 and ground, Mohms min.	: 1.0
Connections 7 and ground Mohms min.	: 1.0

Solenoid valve, start of injection
Connections 1 and 2
Test temperature :

15°...30°C, ohms	: 14.3...17.3
50°...70°C, ohms	: 15.5...21.0
Starting stop mV	: 4120...4650
Shutoff stop mV	: 650...850

B15

B15

Setting values of injection pump
Check values in brackets

Supply pump pressure:
Speed 1/min : 1000
Checkbk. volt.
mV : 3410
Setting value, bar : 7.1...7.7

Timing device travel:
Speed 1/min : 1000
Checkbk. volt
mV : 3410
Setting value, mm : 7.2...7.4

Full-load delivery :
Speed 1/min : 1250
Checkbk. volt
mV : 2320
Fuel delivery cm³/
> 1000s : 29.8...30.2
Dispersion cm³/ : 2.0
> 1000s :

Test specifications of injection pump
Check values in brackets

Supply pump pressure variations:

1st speed 1/min : 2100
Checkbk. volt
mV : 3130
Supply pump
pressure > bar : 9.0...9.8
> bar :

2st speed 1/min : 500
Checkbk. volt
mV : 2840
Supply pump
pressure > bar : 6.3...7.1
> bar :

Timing device variations:

1st speed 1/min : 500
Checkbk. volt. mV : 2840
Timing device
travel mm : 5.5...6.9
> mm : (5.2...7.2)

2nd speed 1/min : 1000
Checkbk. volt. mV : 3410
Timing device
travel mm :
> mm : (7.4...8.2)

3rd speed 1/min : 1500
Checkbk. volt. mV : 1790
Timing device
travel mm : max. 0.5
> mm : (max. 0.8)
Solenoid valve
Start of
injection, volts : 12

4st speed 1/min : 500
Checkbk. volt. mV : 2840
Timing device
travel mm : 5.5...6.9
> mm : (5.2...7.2)

Overflow at overflow valve:

Speed 1/min : 2100
Checkbk. volt. mV : 3130
Overflow : 120...175
> cm³/10s : (92...203)

B16

Fuel delivery variations:

1. Speed	1/min	: 2100
Checkbk. volt	mV	: 3130
Fuel delivery	cm³/	: 60.5...62.5
>	1000s	: (59.5...63.5)
Dispersion	cm³/	: 2.0
>	1000s.	: (2.0)
2. Speed	1/min	: 1250
Checkbk. volt	mV	: 2320
Fuel delivery	cm³/	:
>	1000s	: (28.7...31.3)
Dispersion	cm³/	:
>	1000s	: (3.0)
3. Speed	1/min	: 1000
Checkbk. volt	mV	: 3410
Fuel delivery	cm³/	: 78.3...80.3
>	1000s	: (77.3...81.3)
Dispersion	cm³/	: 2.0
>	1000s	: (2.0)
4. Speed	1/min	: 500
Checkbk. volt	mV	: 2840
Fuel delivery	cm³/	: 44.5...46.5
>	1000s	: (43.5...47.5)
Dispersion	cm³/	: 2.0
>	1000s	: (2.0)

Idle delivery:

Speed	1/min	: 400
Checkbk. volt	mV	: 2110
Fuel delivery	cm³/	: 8.5...10.9
>	1000s	: (7.4...12.0)
Solenoid valve		
Start of		
injection, volts		: 12
Dispersion	cm³/	: 2.0
>	1000s	: (3.0)

Starting fuel delivery:

Speed	1/min	: 100
Checkbk. volt	mV	: 3830
Fuel delivery	cm³/	: 66.0...76.0
>	1000s	: (63.0...79.0)
Solenoid valve		
Start of		
injection, volts		: 12

Stop test:

Speed	1/min	: 1500
Checkbk. volt	mV	: 4000
ELAB	volts	: 0
Fuel delivery	cm³/	: max. 3.0
max.	1000s	:

Shutoff solenoid:

Cut-in voltage	
min.> volts	: 10.0
Rated voltage,	
volts	: 12.0

Dimensions for mounting and setting:

Description		
K	mm	:
KF	mm	:
SVS max.	mm	:
FH	mm	:

B17

BOSCH INJECTION PUMP TEST SPECIFICATIONS

Obsereve notes in remark colum

Test sheet : VW
Date of manufacture :
Edition : 16.07.1996
Replaces :
Test oil : ISO 4113

Injection pump : VE4/10E2075R700

Type No. : 0 460 404 977
Customer Ident.No. :

Customer-specific details
Customer : VW

Engine : 1.9 TDI

Output kW :
Speed 1/min :

TEST BENCH PREREQUISITES

Inlet pressure, bar : 0.30...0.40

Calibrating nozzle-
holder assembly > : 1 688 901 114

Opening
pressure > bar : 207...210

Test pressure line : 1 680 750 085

Outer diameter : 6.00
x wall thickness > : 2.20
x length > mm : 350

Overflow valve : 2 467 413 018

Test line : 0 986 612 444
(fuel-delivery actuator)

Test line : 1 687 011 208
(solenoid valve
start of injection) : (Test cable set)

TEST PRECONDITIONS

Test oil
return temp. > °C
with thermometer : 55

Test oil supply
temperature > °C : 42...47

Hold-up
revolutions >1/min : 1200
Feedback
voltage mV : 2500

ELECTRICAL TEST

Actuator
Connections 5 and 6
Test temperature:
15°...30°C, ohms : 0.4...1.0
50°...70°C, ohms : 0.45...1.1

Connections 5 and.
ground, Mohms min. : 1.0
Connections 6 and
ground, Mohms min. : 1.0
Connections 3 and 5
Mohms min. : 1.0
Connections 6 and 7
Mohms min. : 1.0

High-pressure compressor sensor
Sensor coils
Connections 1 and 2
Ohms : 4.9...6.5
Connections 2 and 3
Ohms : 4.9...6.5
Connections 1 and 3
Ohms : 9.8...13.0

Connections 1 and.
ground, Mohms min. : 1.0
Connections 2 and
ground, Mohms min. : 1.0
Connections 3 and
ground, Mohms min. : 1.0

Temperature sensor, fuel
Connentions 4 and 7
Test temperature:
15°...30°C, kohms : 1.2...4.0
50°...70°C, kohms : 0.3...1.2

Connections 4 and
ground, Mohms min. : 1.0
Connections 7 and
ground Mohms min. : 1.0

Solenoid valve, start of injection
Connections 1 and 2
Test temperature :
15°...30°C, ohms : 14.3...17.3
50°...70°C, ohms : 15.5...21.0

Starting stop mV : 4120...4650

Shutoff stop mV : 650...850

B18

B 18

Setting values of injection pump
Check values in brackets

Supply pump pressure:
Speed 1/min : 500
Checkbk. volt.
mV : 2560
Setting value, bar : 8.4...9.2

Timing device travel:
Speed 1/min : 500
Checkbk. volt
mV : 2510
Setting value, mm : 10.1...10.3

Full-load delivery :
1st temperature-conditioning
revolution 1/min : 2000
Checkbk. volt
mV : 2500
Output
temperature °C : 61
Speed 1/min : 750
Checkbk. volt
mV : 2480
Measuring
temperature °C : 57
Fuel delivery cm³/
> 1000s : 34.7...35.1
Dispersion cm³/ : 2.5
> 1000s :

Test specifications of injection pump
Check values in brackets

Supply pump pressure variations:

1st speed 1/min : 2050
Checkbk. volt
mV : 3890
Supply pump
pressure > bar : 10.9...11.9
> bar :

2st speed 1/min : 300
Checkbk. volt
mV : 2560
Supply pump
pressure > bar : 6.6...8.0
> bar :

Timing device variations:

1st speed 1/min : 500
Checkbk. volt. mV : 2560
Timing device
travel mm :
> mm : (9.2...11.2)

2nd speed 1/min : 2050
Checkbk. volt. mV : 3890
Timing device
travel mm : 11.8...12.8
> mm : (11.5...13.1)

3rd speed 1/min : 1500
Checkbk. volt. mV : 1500
Timing device
travel mm : max. 0.5
> mm : (max. 0.8)
Solenoid valve
Start of
injection, volts : 12

4.th speed 1/min : 300
Checkbk. volt. mV : 2560
Timing device
travel mm : 5.2...9.2
> mm : (3.4...11.0)

Overflow at overflow valve:

1st temperature-conditioning
revolution 1/min : 100
Checkbk. volt. mV : 2500
Output
temperature °C : 51
Speed 1/min : 2050
Checkbk. volt. mV : 3890
Measuring
temperature °C : 53
Overflow : 138...194
> cm³/10s :

B19

Fuel delivery variations:

1st temperature-conditioning
revolution 1/min : 100
Checkbk. volt mV : 2500
Output
temperature °C : 51
Speed 1/min : 2050
Checkbk. volt mV : 3890
Meßtemperatur °C : 53
Fuel delivery cm³/ : 49.5...51.9
> 1000s : (48.9...52.5)
Dispersion cm³/ : 3.0
> 1000s. :

2nd temperature-conditioning
revolution 1/min : 2000
Checkbk. volt mV : 2500
Output
temperature °C : 61
Speed 1/min : 750
Checkbk. volt mV : 2480
Measuring
temperature °C : 57
Fuel delivery cm³/ :
> 1000s : (33.6...36.2)
Dispersion cm³/ :
> 1000s : (2.5)

3rd temperature-conditioning
revolution 1/min : 2000
Checkbk. volt mV : 2500
Output
temperature °C : 61
Speed 1/min : 500
Checkbk. volt mV : 2560
Measuring
temperature °C : 57
Fuel delivery cm³/ : 41.9...44.5
> 1000s : (41.2...45.2)
Dispersion cm³/ : 3.0
> 1000s :

Idle delivery:
1st temperature-conditioning
revolution 1/min : 2000
Checkbk. volt mV : 2500
Output
temperature °C : 61
Speed 1/min : 400
Checkbk. volt mV : 1800
Meßtemperatur °C : 57
Fuel delivery cm³/ : 9.2...10.2
> 1000s : (6.7...12.7)
Solenoid valve
Start of
injection, volts : 12
Dispersion cm³/ : 3.0
> 1000s : (4.0)

Starting fuel delivery:
1st temperature-conditioning
revolution 1/min : 2000
Checkbk. volt mV : 2500
Output
temperature °C : 65
Speed 1/min : 100
Checkbk. volt mV : 2420
Measuring
temperature °C : 61
Fuel delivery cm³/ : 35.7...45.7
> 1000s : (32.7...48.7)
Solenoid valve
Start of
injection, volts : 12

Stop test:
Speed 1/min : 1000
Checkbk. volt mV : 4000
ELAB volts : 0
Fuel delivery cm³/ :
max. 1000s : 3.0
Start of

Shutoff solenoid:
Cut-in voltage
min.> volts : 10.0
Rated voltage,
volts : 12.0

Notes:
High-pressure compressor sensor
Testing only possible with ballast
EPS 910

Take note of test instructions
"Distributor pump for direct
injectors"!

Dimensions for mounting and setting:

Description
K mm :
KF mm : 8.2...8.6
SVS max. mm :
FH mm :
TS : 1 467 010 495

B20

BOSCH INJECTION PUMP TEST SPECIFICATIONS

Obsereve notes in remark colum

Test sheet	: VW
Date of manufacture	:
Edition	: 19.02.1997
Replaces	:
Test oil	: ISO 4113
Injection pump	: VE4/10E2250R590-2
Type No.	: 0 460 404 978
Customer Ident.No.	:

Customer-specific details

Customer	: VW
Engine	: 1.9 TDI EDC
Output kW	:
Speed 1/min	:

TEST BENCH PREREQUISITES

Inlet pressure, bar	: 0.30...0.40
Calibrating nozzle-holder assembly >	: 1 688 901 114
Opening pressure > bar	: 207...210
Test pressure line	: 1 680 750 085
Outer diameter	: 6.00
x wall thickness >	: 2.20
x length > mm	: 350
Overflow valve	: 2 467 413 018
Test line	: 0 986 612 439
(fuel-delivery actuator)	: (KDEP 1865/10)
Test line	: 0 986 611 983
(solenoid valve start of injection)	: (KDEP 1190)

TEST PRECONDITIONS

Test oil return temp. > °C with thermometer	: 55
Test oil supply temperature > °C	: 42...47
Hold-up revolutions >1/min	: 1200
Feedback voltage mV	: 2500

ELECTRICAL TEST

Actuator
Connections 5 and 6
Test temperature:

15°...30°C, ohms	: 0.4...1.0
50°...70°C, ohms	: 0.45...1.1
Connections 5 and. ground, Mohms min.	: 1.0
Connections 6 and ground, Mohms min.	: 1.0
Connections 3 and 5 Mohms min.	: 1.0
Connections 6 and 7 Mohms min.	: 1.0

High-pressure compressor sensor
Sensor coils

Connections 1 and 2 Ohms	: 4.9...6.5
Connections 2 and 3 Ohms	: 4.9...6.5
Connections 1 and 3 Ohms	: 9.8...13.0
Connections 1 and. ground, Mohms min.	: 1.0
Connections 2 and ground, Mohms min.	: 1.0
Connections 3 and ground, Mohms min.	: 1.0

Temperature sensor, fuel
Connentions 4 and 7
Test temperature:

15°...30°C, kohms	: 1.2...4.0
50°...70°C, kohms	: 0.3...1.2
Connections 4 and ground, Mohms min.	: 1.0
Connections 7 and ground Mohms min.	: 1.0

Solenoid valve, start of injection
Connections 1 and 2
Test temperature :

15°...30°C, ohms	: 14.3...17.3
50°...70°C, ohms	: 15.5...21.0
Starting stop mV	: 4120...4650
Shutoff stop mV	: 650...850

B21

B21

Setting values of injection pump
Check values in brackets

Supply pump pressure:

Speed	1/min	:	500
Checkbk. volt. mV		:	2450
Setting value,	bar	:	7.3...8.7

Timing device travel:

Speed	1/min	:	500
Checkbk. volt mV		:	2450
Setting value,	mm	:	9.7...9.9

Full-load delivery :

1st temperature-conditioning revolution	1/min	:	2000
Checkbk. volt mV		:	2500
Output temperature	°C	:	61
Speed	1/min	:	750
Checkbk. volt mV		:	2420
Measuring temperature	°C	:	57
Fuel delivery	cm³/ 1000s	:	37.2...37.6
Dispersion >	cm³/ 1000s	:	2,5

Test specifications of injection pump
Check values in brackets

Supply pump pressure variations:

1st speed	1/min	:	2000
Checkbk. volt mV		:	4000
Supply pump pressure >	bar	:	9.7...11.1
>	bar	:	(9.6...11.2)
2st speed	1/min	:	300
Checkbk. volt mV		:	2450
Supply pump pressure >	bar	:	6.5...8.1
>	bar	:	(6.4...8.2)

Timing device variations:

1st speed	1/min	:	500
Checkbk. volt. mV		:	2450
Timing device travel	mm	:	
>	mm	:	(8.8...10.8)
2nd speed	1/min	:	2000
Checkbk. volt. mV		:	4000
Timing device travel	mm	:	11.5...12.9
>	mm	:	(11.4...13.0)
3rd speed	1/min	:	1400
Checkbk. volt. mV		:	1310
Timing device travel	mm	:	max. 0.5
>	mm	:	(max. 0.8)
Solenoid valve Start of injection,	volts	:	12
4.th speed	1/min	:	300
Checkbk. volt. mV		:	2450
Timing device travel	mm	:	6.5...9.7
>	mm	:	(6.1...10.1)

Overflow at overflow valve:

1st temperature-conditioning revolution	1/min	:	100
Checkbk. volt. mV		:	2500
Output temperature	°C	:	51
Speed	1/min	:	2000
Checkbk. volt. mV		:	4000
Measuring temperature	°C	:	53
Overflow		:	97...208
>	cm³/10s	:	

B22

B22

Fuel delivery variations:

1st temperature-conditioning		
revolution	1/min	: 100
Checkbk. volt	mV	: 2500
Output		
temperature	°C	: 51
Speed	1/min	: 2000
Checkbk. volt	mV	: 4000
Meßtemperatur	°C	: 53
Fuel delivery	cm³/	: 54.2...57.2
>	1000s	: (53.9...57.5)
Dispersion	cm³/	: 2.5
>	1000s.	: (2.5)

2nd temperature-conditioning		
revolution	1/min	: 2000
Checkbk. volt	mV	: 2500
Output		
temperature	°C	: 61
Speed	1/min	: 750
Checkbk. volt	mV	: 2420
Measuring		
temperature	°C	: 57
Fuel delivery	cm³/	:
>	1000s	: (36.1...38.7)
Dispersion	cm³/	:
>	1000s	: (2.5)

3rd temperature-conditioning		
revolution	1/min	: 2000
Checkbk. volt	mV	: 2500
Output		
temperature	°C	: 61
Speed	1/min	: 500
Checkbk. volt	mV	: 2450
Measuring		
temperature	°C	: 57
Fuel delivery	cm³/	: 43.6...46.6
>	1000s	: (42.8...47.4)
Dispersion	cm³/	: 3.0
>	1000s	: (3.0)

Idle delivery:		
1st temperature-conditioning		
revolution	1/min	: 2000
Checkbk. volt	mV	: 2500
Output		
temperature	°C	: 61
Speed	1/min	: 400
Checkbk. volt	mV	: 1550
Meßtemperatur	°C	: 57
Fuel delivery	cm³/	: 6.8...11.8
>	1000s	: (6.3...12,3)
Solenoid valve.Start of		
injection, volts		: 12
Dispersion	cm³/	: 4.0
>	1000s	: (4.0)

Starting fuel delivery:		
1st temperature-conditioning		
revolution	1/min	: 2000
Checkbk. volt	mV	: 2500
Output		
temperature	°C	: 65
Speed	1/min	: 100
Checkbk. volt	mV	: 2310
Measuring		
temperature	°C	: 61
Fuel delivery	cm³/	: 36.0...48.0
>	1000s	: (34.0...50.0)
Solenoid valve		
Start of		
injection, volts		: 12

Stop test:		
Speed	1/min	: 750
Checkbk. volt	mV	: 3650
ELAB	volts	: 0
Fuel delivery	cm³/	:
max.	1000s	: 3.0
Start of		

Shutoff solenoid:		
Cut-in voltage		
min.> volts		: 10,0
Rated voltage,		
	volts	: 12,0

Notes:
High-pressure compressor sensor
Testing only possible with ballast
EPS 910

Take note of test instructions
"Distributor pump for direct
injectors"!

Dimensions for mounting and setting:

Description		
K	mm	:
KF	mm	: 6.2...6.6
SVS max.	mm	:
FH	mm	:
TS		: 1 467 010 410

B23

B23

BOSCH INJECTION PUMP TEST SPECIFICATIONS

Obsereve notes in remark colum

Test sheet	: VW
Date of manufacture	:
Edition	: 22.05.1996
Replaces	:
Test oil	: ISO 4113
Injection pump	: VE4/10E2075R696
Type No.	: 0 460 404 979
Customer Ident.No.	:

Customer-specific details

Customer	: VW
Engine	: 1.9 TDI
Output kW	:
Speed 1/min	:

TEST BENCH PREREQUISITES

Inlet pressure, bar	: 0.30...0.40
Calibrating nozzle-holder assembly >	: 1 688 901 114
Opening pressure > bar	: 207...210
Test pressure line	: 1 680 750 085
Outer diameter	: 6.00
x wall thickness >	: 2.20
x length > mm	: 350
Overflow valve	: 2 467 413 018
Test line (fuel-delivery actuator)	: 0 986 612 444
Test line (solenoid valve start of injection)	: 1 687 011 208 (Test cable set)

TEST PRECONDITIONS

Test oil return temp. > °C with thermometer	: 55
Test oil supply temperature > °C	: 42...47
Hold-up revolutions >1/min	: 1200
Feedback voltage mV	: 2500

ELECTRICAL TEST

Actuator
Connections 5 and 6
Test temperature:

15°...30°C, ohms	: 0.4...1.0
50°...70°C, ohms	: 0.45...1.1

Connections 5 and. ground, Mohms min.	: 1.0
Connections 6 and ground, Mohms min.	: 1.0
Connections 3 and 5 Mohms min.	: 1.0
Connections 6 and 7 Mohms min.	: 1.0

High-pressure compressor sensor
Sensor coils

Connections 1 and 2 Ohms	: 4.9...6.5
Connections 2 and 3 Ohms	: 4.9...6.5
Connections 1 and 3 Ohms	: 9.8...13.0
Connections 1 and. ground, Mohms min.	: 1.0
Connections 2 and ground, Mohms min.	: 1.0
Connections 3 and ground, Mohms min.	: 1.0

Temperature sensor, fuel
Connentions 4 and 7
Test temperature:

15°...30°C, kohms	: 1.2...4.0
50°...70°C, kohms	: 0.3...1.2

Connections 4 and ground, Mohms min.	: 1.0
Connections 7 and ground Mohms min.	: 1.0

Solenoid valve, start of injection
Connections 1 and 2
Test temperature :

15°...30°C, ohms	: 14.3...17.3
50°...70°C, ohms	: 15.5...21.0
Starting stop mV	: 4120...4650
Shutoff stop mV	: 650...850

B24

B24

Setting values of injection pump
Check values in brackets

Supply pump pressure:
Speed 1/min : 500
Checkbk. volt.
mV : 2560
Setting value, bar : 8.4...9.2

Timing device travel:
Speed 1/min : 500
Checkbk. volt
mV : 2560
Setting value, mm : 10.1...10.3

Full-load delivery :
1st temperature-conditioning
revolution 1/min : 2000
Checkbk. volt
mV : 2500
Output
temperature °C : 61
Speed 1/min : 750
Checkbk. volt
mV : 2480
Measuring
temperature °C : 57
Fuel delivery cm³/
> 1000s : 34.7...35.1
Dispersion cm³/ : 2,5
> 1000s :

Test specifications of injection pump
Check values in brackets

Supply pump pressure variations:

1st speed 1/min : 2050
Checkbk. volt
mV : 3890
Supply pump
pressure > bar : 10.9...11.9
> bar :

2st speed 1/min : 300
Checkbk. volt
mV : 2560
Supply pump
pressure > bar : 6.6...8.0
> bar :

Timing device variations:

1st speed 1/min : 500
Checkbk. volt. mV : 2560
Timing device
travel mm :
> mm : (9.2...11.2)

2nd speed 1/min : 2050
Checkbk. volt. mV : 3890
Timing device
travel mm : 11.8...12.8
> mm : (11.5...13.1)

3rd speed 1/min : 1500
Checkbk. volt. mV : 1500
Timing device
travel mm : max. 0.5
> mm : (max. 0.8)
Solenoid valve
Start of
injection, volts : 12

4.th speed 1/min : 300
Checkbk. volt. mV : 2560
Timing device
travel mm : 5.2...9.2
> mm : (3.4...11.0)

Overflow at overflow valve:

1st temperature-conditioning
revolution 1/min : 100
Checkbk. volt. mV : 2500
Output
temperature °C : 51
Speed 1/min : 2050
Checkbk. volt. mV : 3890
Measuring
temperature °C : 53
Overflow : 138...194
> cm³/10s :

C1

Fuel delivery variations:

1st temperature-conditioning
revolution 1/min : 100
Checkbk. volt mV : 2500
Output
temperature °C : 51
Speed 1/min : 2050
Checkbk. volt mV : 3890
Meßtemperatur °C : 53
Fuel delivery cm³/ : 49.5...51.9
> 1000s : (48.9...52.5)
Dispersion cm³/ : 3.0
> 1000s. :

2nd temperature-conditioning
revolution 1/min : 2000
Checkbk. volt mV : 2500
Output
temperature °C : 61
Speed 1/min : 750
Checkbk. volt mV : 2480
Measuring
temperature °C : 57
Fuel delivery cm³/ :
> 1000s : (33.6...36.2)
Dispersion cm³/ :
> 1000s : (2.5)

3rd temperature-conditioning
revolution 1/min : 2000
Checkbk. volt mV : 2500
Output
temperature °C : 61
Speed 1/min : 500
Checkbk. volt mV : 2560
Measuring
temperature °C : 57
Fuel delivery cm³/ : 41.9...44.5
> 1000s : (41.2...45.2)
Dispersion cm³/ : 3.0
> 1000s :

Idle delivery:
1st temperature-conditioning
revolution 1/min : 2000
Checkbk. volt mV : 2500
Output
temperature °C : 61
Speed 1/min : 400
Checkbk. volt mV : 1800
Meßtemperatur °C : 57
Fuel delivery cm³/ : 9.2...10.2
> 1000s : (6.7...12.7)
Solenoid valve
Start of
injection, volts : 12
Dispersion cm³/ : 3.0
> 1000s : (4.0)

Starting fuel delivery:
1st temperature-conditioning
revolution 1/min : 2000
Checkbk. volt mV : 2500
Output
temperature °C : 65
Speed 1/min : 100
Checkbk. volt mV : 2420
Measuring
temperature °C : 61
Fuel delivery cm³/ : 35.7...45.7
> 1000s : (32.7...48.7)
Solenoid valve
Start of
injection, volts : 12

Stop test:
Speed 1/min : 1000
Checkbk. volt mV : 4000
ELAB volts : 0
Fuel delivery cm³/ :
max. 1000s : 3.0
Start of

Shutoff solenoid:
Cut-in voltage
min.> volts : 10.0
Rated voltage,
volts : 12.0

Notes:
High-pressure compressor sensor
Testing only possible with ballast
EPS 910

Take note of test instructions
"Distributor pump for direct
injectors"!

Dimensions for mounting and setting:

Description
K mm :
KF mm : 8.2...8.6
SVS max. mm :
FH mm :
TS : 1 467 010 495

C2

C2

BOSCH INJECTION PUMP TEST SPECIFICATIONS

Obsereve notes in remark colum

Test sheet : Chrysler
Date of manufacture:
Edition : 10.12.1996
Replaces :
Test oil : ISO 4113

Injection pump : VE4/10E2100L694

Type No. : 0 460 404 980
Customer Ident.No. :

Customer-specific details
Customer : Chrysler

Engine : 425 CLIEZ/CLIEF

Output kW :
Speed 1/min :

TEST BENCH PREREQUISITES

Inlet pressure, bar: 0.30...0.40

Calibrating nozzle-
holder assembly > : 1 688 901 022

Opening
pressure > bar : 130...133

Test pressure line : 1 680 750 073

Outer diameter : 6.00
x wall thickness > : 2.00
x length > mm : 450

Overflow valve : 2 467 413 018

Test line : 0 986 612 445
(fuel-delivery actuator)

Test line : 1 687 011 208
(solenoid valve
start of injection): (Test cable set)

ELECTRICAL TEST

Actuator
Connections 8 and 9
Test temperature:
15°...30°C, ohms : 0.4...1.0
50°...70°C, ohms : 0.45...1.1

Connections 8 and.
ground, Mohms min. : 1.0
Connections 9 and
ground, Mohms min. : 1.0
Connections 2 and 8
Mohms min. : 1.0
Connections 7 and 9
Mohms min. : 1.0

High-pressure compressor sensor
Sensor coils
Connections 1 and 2
kohms : 4.9...6.5
Connections 3 and 2
kohms : 4.9...6.5
Connections 1 and 3
kohms : 9.8...13.0

Connections 1 and.
ground, Mohms min. : 1.0
Connections 2 and
ground, Mohms min. : 1.0
Connections 3 and
ground, Mohms min. : 1.0

Temperature sensor, fuel
Connentions 4 and 7
Test temperature:
15°...30°C, kohms : 1.2...4.0
50°...70°C, kohms : 0.3...1.2

Connections 4 and
ground, Mohms min. : 1.0
Connections 7 and
ground Mohms min. : 1.0

Solenoid valve, start of injection
Connections 1 and 2
Test temperature :
15°...30°C, ohms : 14.3...17.3
50°...70°C, ohms : 15.5...21.0

Starting stop mV : 4120...4650

Shutoff stop mV : 650...850

C3

C3

Setting values of injection pump
Check values in brackets

Supply pump pressure:
Speed 1/min : 1000
Checkbk. volt.
mV : 3100
Setting value, bar : 6.4...7.8

Timing device travel:
Speed 1/min : 1000
Checkbk. volt
mV : 3100
Setting value, mm : 6.9...7.1

Full-load delivery :
Speed 1/min : 1250
Checkbk. volt
mV : 2270
Fuel delivery cm^3/
> 1000s : 30.6...31.0
Dispersion cm^3/ : 2.0
> 1000s :

Test specifications of injection pump
Check values in brackets

Supply pump pressure variations:

1st speed 1/min : 2100
Checkbk. volt
mV : 3100
Supply pump
pressure > bar : 8.0...9.4
> bar :

2st speed 1/min : 500
Checkbk. volt
mV : 3100
Supply pump
pressure > bar : 6.0...7.4
> bar :

3st speed 1/min : 150
Checkbk. volt
mV : 3680
Supply pump
pressure > bar : min. 3.5
> bar :

Timing device variations:

1st speed 1/min : 500
Checkbk. volt. mV : 3100
Timing device
travel mm : 5.2...6.8
> mm : (5.0...7.0)

2nd speed 1/min : 1000
Checkbk. volt. mV : 3100
Timing device
travel mm :
> mm : (6.1...7.9)

3rd speed 1/min : 1500
Checkbk. volt. mV : 1680
Timing device
travel mm : max. 0.5
> mm : (max. 1.5)
Solenoid valve
Start of
injection, volts : 12

4rd speed 1/min : 2100
Checkbk. volt. mV : 3100
Timing device
travel mm : 9.4...10.2
> mm : (9.3...10.3)

Overflow at overflow valve:

Speed 1/min : 2100
Checkbk. volt. mV : 3100
Overflow : 111...167
> cm^3/10s :

C4

C4

Fuel delivery variations:

1. Speed	1/min	: 2100
Checkbk. volt	mV	: 3100
Fuel delivery	cm³/	: 63.5...66.5
>	1000s	: (63.0...67.0)
Dispersion	cm³/	:
>	1000s.	:
2. Speed	1/min	: 1250
Checkbk. volt	mV	: 2270
Fuel delivery	cm³/	:
>	1000s	: (29.5...32.1)
Dispersion	cm³/	:
>	1000s	: (3.0)
3. Speed	1/min	: 1000
Checkbk. volt	mV	: 3100
Fuel delivery	cm³/	: 66.7...69.7
>	1000s	: (66.2...70.2)
Dispersion	cm³/	: 2.0
>	1000s	:
4. Speed	1/min	: 500
Checkbk. volt	mV	: 2660
Fuel delivery	cm³/	: 43.4...46.4
>	1000s	: (42.9...46.9)
Dispersion	cm³/	: 2.0
>	1000s	:

Idle delivery:

Speed	1/min	: 400
Checkbk. volt	mV	: 2000
Fuel delivery	cm³/	: 12.1...15.5
>	1000s	: (11.5...16.1)
Solenoid valve		
Start of		
injection, volts		: 12
Dispersion	cm³/	: 2.0
>	1000s	: (3.0)

Starting fuel delivery:

Speed	1/min	: 100
Checkbk. volt	mV	: 3680
Fuel delivery	cm³/	: 72.0...82.0
>	1000s	: (69.0...85.0)
Solenoid valve		
Start of		
injection, volts		: 12

Stop test:

Speed	1/min	: 2100
Checkbk. volt	mV	: 3100
ELAB	volts	: 0
Fuel delivery	cm³/	: max. 3.0
max.	1000s	:

Shutoff solenoid:

Cut-in voltage	
min.> volts	: 10.0
Rated voltage,	
volts	: 12.0

Dimensions for mounting and setting:

Description		
K	mm	:
KF	mm	:
SVS max.	mm	:
FH	mm	:

C5

C5

BOSCH INJECTION PUMP TEST SPECIFICATIONS

Obsereve notes in remark colum

Test sheet : Ford
Date of manufacture :
Edition : 19.03.1996
Replaces :
Test oil : ISO 4113

Injection pump : VE4/10E2100L688

Type No. : 0 460 404 981
Customer Ident.No. :

Customer-specific details
Customer : Ford

Engine : 425 CLIEF

Output kW :
Speed 1/min :

TEST BENCH PREREQUISITES

Inlet pressure, bar : 0.30...0.40

Calibrating nozzle-holder assembly > : 1 688 901 022

Opening pressure > bar : 130...133

Test pressure line : 1 680 750 073

Outer diameter : 6.00
x wall thickness > : 2.00
x length > mm : 450

Overflow valve : 2 467 413 018

Test line : 0 986 612 446
(fuel-delivery actuator)

Test line : 1 687 011 208
(solenoid valve
start of injection) : (Test cable set)

ELECTRICAL TEST

Actuator
Connections 6 and 5
Test temperature:
15°...30°C, ohms : 0.4...1.0
50°...70°C, ohms : 0.45...1.1

Connections 6 and.
ground, Mohms min. : 1.0
Connections 5 and
ground, Mohms min. : 1.0
Connections 2 and 6
Mohms min. : 1.0
Connections 7 and 5
Mohms min. : 1.0

High-pressure compressor sensor
Sensor coils
Connections 1 and 2
kohms : 4.9...6.5
Connections 2 and 3
kohms : 4.9...6.5
Connections 1 and 3
kohms : 9.8...13.0

Connections 1 and.
ground, Mohms min. : 1.0
Connections 2 and
ground, Mohms min. : 1.0
Connections 3 and
ground, Mohms min. : 1.0

Temperature sensor, fuel
Connentions 4 and 7
Test temperature:
15°...30°C, kohms : 1.2...4.0
50°...70°C, kohms : 0.3...1.2

Connections 4 and
ground, Mohms min. : 1.0
Connections 7 and
ground Mohms min. : 1.0

Solenoid valve, start of injection
Connections 1 and 2
Test temperature :
15°...30°C, ohms : 14.3...17.3
50°...70°C, ohms : 15.5...21.0

Starting stop mV : 4120...4650

Shutoff stop mV : 650...850

C6

C6

Setting values of injection pump
Check values in brackets

Supply pump pressure:

Speed	1/min	: 1000
Checkbk. volt. mV		: 3100
Setting value, bar		: 6.8...7.4

Timing device travel:

Speed	1/min	: 1000
Checkbk. volt mV		: 3100
Setting value, mm		: 6.9...7.1

Full-load delivery :

1st temperature-conditioning revolution	1/min	: 1250
Checkbk. volt mV		: 2270
Fuel delivery	cm^3/ 1000s	: 30.1...30.5
Dispersion	cm^3/ 1000s	: 2.0

Test specifications of injection pump
Check values in brackets

Supply pump pressure variations:

1st speed	1/min	: 2100
Checkbk. volt mV		: 3100
Supply pump pressure >	bar	: 8.3...9.1
>	bar	:
2st speed	1/min	: 500
Checkbk. volt mV		: 3100
Supply pump pressure >	bar	: 6.3...7.1
>	bar	:
3st speed	1/min	: 150
Checkbk. volt mV		: 3680
Supply pump pressure >	bar	: min.. 3.5
>	bar	:

Timing device variations:

1st speed	1/min	: 500
Checkbk. volt. mV		: 3100
Timing device travel	mm	: 5.3...6.7
>	mm	: (5.0...7.0)
2nd speed	1/min	: 1000
Checkbk. volt. mV		: 3100
Timing device travel	mm	:
>	mm	: (6.1...7.9)
3rd speed	1/min	: 1500
Checkbk. volt. mV		: 1680
Timing device travel	mm	: max. 0.5
>	mm	: (max. 1.5)
Solenoid valve Start of injection, volts		: 12
4.th speed	1/min	: 2100
Checkbk. volt. mV		: 3100
Timing device travel	mm	: 9.5...10.1
>	mm	: (9.3...10.3)

Overflow at overflow valve:

Speed	1/min	: 2100
Checkbk. volt. mV		: 3100
Overflow		: 83...138
>	cm^3/10s	:

C7

C7

Fuel delivery variations:

1. Speed	1/min	: 2100
Checkbk. volt	mV	: 3100
Fuel delivery	cm³/	: 64.0...66.0
>	1000s	: (63.0...67.0)
Dispersion	cm³/	:
>	1000s.	:
2. Speed	1/min	: 1250
Checkbk. volt	mV	: 2270
Fuel delivery	cm³/	:
>	1000s	: (29.0...31.6)
Dispersion	cm³/	:
>	1000s	: (3.0)
3. Speed	1/min	: 1000
Checkbk. volt	mV	: 3100
Fuel delivery	cm³/	: 67.2...69.2
>	1000s	: (66.2...70.2)
Dispersion	cm³/	: 2.0
>	1000s	: (2.0)
4. Speed	1/min	: 500
Checkbk. volt	mV	: 2660
Fuel delivery	cm³/	: 43.7...45.7
>	1000s	: (42.7...46.7)
Dispersion	cm³/	: 2.0
>	1000s	: (2.0)

Idle delivery:

Speed	1/min	: 400
Checkbk. volt	mV	: 2000
Fuel delivery	cm³/	: 12.0...14.4
>	1000s	: (10.9...15.5)
Solenoid valve		
Start of		
injection, volts		: 12
Dispersion	cm³/	: 2.0
>	1000s	: (3.0)

Starting fuel delivery:

Speed	1/min	: 100
Checkbk. volt	mV	: 3680
Fuel delivery	cm³/	: 72.0...82.0
>	1000s	: (69.0...85.0)
Solenoid valve		
Start of		
injection, volts		: 12

Stop test:

Speed	1/min	: 2100
Checkbk. volt	mV	: 3100
ELAB	volts	: 0
Fuel delivery	cm³/	: max. 3.0
max.	1000s	:

Shutoff solenoid:

Cut-in voltage	
min.> volts	: 10.0
Rated voltage,	
volts	: 12.0

Dimensions for mounting and setting:

Description		
K	mm	:
KF	mm	:
SVS max.	mm	:
FH	mm	:

C8

C8

BOSCH INJECTION PUMP TEST SPECIFICATIONS

Obsereve notes in remark colum

Test sheet	: VW
Date of manufacture	:
Edition	: 22.05.1996
Replaces	:
Test oil	: ISO 4113
Injection pump	: VE4/10E2075R650
Type No.	: 0 460 404 984
Customer Ident.No.	:

Customer-specific details

Customer	: VW
Engine	: 1.9 TDI
Output kW	:
Speed 1/min	:

TEST BENCH PREREQUISITES

Inlet pressure, bar	: 0.30...0.40
Calibrating nozzle-holder assembly >	: 1 688 901 114
Opening pressure > bar	: 207...210
Test pressure line	: 1 680 750 085
Outer diameter	: 6.00
x wall thickness >	: 2.20
x length > mm	: 350
Overflow valve	: 2 467 413 018
Test line (fuel-delivery actuator)	: 0 986 612 444
Test line (solenoid valve start of injection)	: 1 687 011 208 (Test cable set)

TEST PRECONDITIONS

Test oil return temp. > °C with thermometer	: 55
Test oil supply temperature > °C	: 42...47
Hold-up revolutions >1/min	: 1200
Feedback voltage mV	: 2500

ELECTRICAL TEST

Actuator
Connections 5 and 6
Test temperature:

15°...30°C, ohms	: 0.4...1.0
50°...70°C, ohms	: 0.45...1.1
Connections 5 and. ground, Mohms min.	: 1.0
Connections 6 and ground, Mohms min.	: 1.0
Connections 3 and 5 Mohms min.	: 1.0
Connections 6 and 7 Mohms min.	: 1.0

High-pressure compressor sensor
Sensor coils
Connections 1 and 2

Ohms	: 4.9...6.5

Connections 2 and 3

Ohms	: 4.9...6.5

Connections 1 and 3

Ohms	: 9.8...13.0
Connections 1 and. ground, Mohms min.	: 1.0
Connections 2 and ground, Mohms min.	: 1.0
Connections 3 and ground, Mohms min.	: 1.0

Temperature sensor, fuel
Connentions 4 and 7
Test temperature:

15°...30°C, kohms	: 1.2...4.0
50°...70°C, kohms	: 0.3...1.2
Connections 4 and ground, Mohms min.	: 1.0
Connections 7 and ground Mohms min.	: 1.0

Solenoid valve, start of injection
Connections 1 and 2
Test temperature :

15°...30°C, ohms	: 14.3...17.3
50°...70°C, ohms	: 15.5...21.0
Starting stop mV	: 4120...4650
Shutoff stop mV	: 650...850

C9

C9

Setting values of injection pump
Check values in brackets

Supply pump pressure:
Speed 1/min : 500
Checkbk. volt.
mV : 2560
Setting value, bar : 8.4...9.2

Timing device travel:
Speed 1/min : 500
Checkbk. volt
mV : 2560
Setting value, mm : 10.1...10.3

Full-load delivery :
1st temperature-conditioning
revolution 1/min : 2000
Checkbk. volt
mV : 2500
Output
temperature °C : 61
Speed 1/min : 750
Checkbk. volt
mV : 2480
Measuring
temperature °C : 57
Fuel delivery cm^3/
> 1000s : 34.7...35.1
Dispersion cm^3/ : 2.5
> 1000s :

Test specifications of injection pump
Check values in brackets

Supply pump pressure variations:

1st speed 1/min : 2050
Checkbk. volt
mV : 3890
Supply pump
pressure > bar : 10.9...11.9
> bar :

2st speed 1/min : 300
Checkbk. volt
mV : 2560
Supply pump
pressure > bar : 6.6...8.0
> bar :

Timing device variations:

1st speed 1/min : 500
Checkbk. volt. mV : 2560
Timing device
travel mm :
> mm : (9.2...11.2)

2nd speed 1/min : 2050
Checkbk. volt. mV : 3890
Timing device
travel mm : 11.8...12.8
> mm : (11.5...13.1)

3rd speed 1/min : 1500
Checkbk. volt. mV : 1500
Timing device
travel mm : max. 0.5
> mm : (max. 0.8)
Solenoid valve
Start of
injection, volts : 12

4.th speed 1/min : 300
Checkbk. volt. mV : 2560
Timing device
travel mm : 5.2...9.2
> mm : (3.4...11.0)

Overflow at overflow valve:

1st temperature-conditioning
revolution 1/min : 100
Checkbk. volt. mV : 2500
Output
temperature °C : 51
Speed 1/min : 2050
Checkbk. volt. mV : 3890
Measuring
temperature °C : 53
Overflow : 138...194
> cm^3/10s :

Fuel delivery variations:

1st temperature-conditioning
revolution 1/min : 100
Checkbk. volt mV : 2500
Output
temperature °C : 51
Speed 1/min : 2050
Checkbk. volt mV : 3890
Meßtemperatur °C : 53
Fuel delivery cm³/ : 49.5...51.9
> 1000s : (48.9...52.5)
Dispersion cm³/ : 3.0
> 1000s. :

2nd temperature-conditioning
revolution 1/min : 2000
Checkbk. volt mV : 2500
Output
temperature °C : 61
Speed 1/min : 750
Checkbk. volt mV : 2480
Measuring
temperature °C : 57
Fuel delivery cm³/ :
> 1000s : (33.6...36.2)
Dispersion cm³/ :
> 1000s : (2.5)

3rd temperature-conditioning
revolution 1/min : 2000
Checkbk. volt mV : 2500
Output
temperature °C : 61
Speed 1/min : 500
Checkbk. volt mV : 2560
Measuring
temperature °C : 57
Fuel delivery cm³/ : 41.9...44.5
> 1000s : (41.2...45.2)
Dispersion cm³/ : 3.0
> 1000s :

Idle delivery:
1st temperature-conditioning
revolution 1/min : 2000
Checkbk. volt mV : 2500
Output
temperature °C : 61
Speed 1/min : 400
Checkbk. volt mV : 1800
Meßtemperatur °C : 57
Fuel delivery cm³/ : 9.2...10.2
> 1000s : (6.7...12.7)
Solenoid valve
Start of
injection, volts : 12
Dispersion cm³/ : 3.0
> 1000s : (4.0)

Starting fuel delivery:
1st temperature-conditioning
revolution 1/min : 2000
Checkbk. volt mV : 2500
Output
temperature °C : 65
Speed 1/min : 100
Checkbk. volt mV : 2420
Measuring
temperature °C : 61
Fuel delivery cm³/ : 35.7...45.7
> 1000s : (32.7...48.7)
Solenoid valve
Start of
injection, volts : 12

Stop test:
Speed 1/min : 1000
Checkbk. volt mV : 4000
ELAB volts : 0
Fuel delivery cm³/ :
max. 1000s : 3.0
Start of

Shutoff solenoid:
Cut-in voltage
min.> volts : 10.0
Rated voltage,
volts : 12.0

Notes:
High-pressure compressor sensor
Testing only possible with ballast
EPS 910

Take note of test instructions
"Distributor pump for direct
injectors"!

Dimensions for mounting and setting:

Description		
K	mm	: 3,6...3,8
KF	mm	: 8,2...8,6
SVS max.	mm	:
FH	mm	:
TS		: 1 467 010 495

C11

C11

BOSCH INJECTION PUMP TEST SPECIFICATIONS

Obsereve notes in remark colum

Test sheet : VW
Date of manufacture :
Edition : 28.10.1996
Replaces :
Test oil : ISO 4113

Injection pump : VE4/10E2250R510-1

Type No. : 0 460 404 985
Customer Ident.No. :

Customer-specific details
Customer : Audi

Engine : 1.9 TDI

Output kW :
Speed 1/min :

TEST BENCH PREREQUISITES

Inlet pressure, bar : 0,30...0,40

Calibrating nozzle-
holder assembly > : 1 688 901 114

Opening
pressure > bar : 207...210

Test pressure line : 1 680 750 085

Outer diameter : 6,00
x wall thickness > : 2,20
x length > mm : 350

Overflow valve : 2 467 413 018

Test line : 0 986 612 439
(fuel-delivery
actuator) : (KDEP 1865/10)

Test line : 0 986 611 983
(solenoid valve
start of injection) : (KDEP 1190)

TEST PRECONDITIONS

Test oil
return temp. > °C
with thermometer : 55

Test oil supply
temperature > °C : 42...47

Hold-up
revolutions >1/min : 1200
Feedback
voltage mV : 2500

ELECTRICAL TEST

Actuator
Connections 5 and 6
Test temperature:
15°...30°C, ohms : 0.4...1.0
50°...70°C, ohms : 0.45...1.1

Connections 5 and.
ground, Mohms min. : 1.0
Connections 6 and
ground, Mohms min. : 1.0
Connections 3 and 5
Mohms min. : 1.0
Connections 6 and 7
Mohms min. : 1.0

High-pressure compressor sensor
Sensor coils
Connections 1 and 2
Ohms : 4.9...6.5
Connections 2 and 3
Ohms : 4.9...6.5
Connections 1 and 3
Ohms : 9.8...13.0

Connections 1 and.
ground, Mohms min. : 1.0
Connections 2 and
ground, Mohms min. : 1.0
Connections 3 and
ground, Mohms min. : 1.0

Temperature sensor, fuel
Connentions 4 and 7
Test temperature:
15°...30°C, kohms : 1.2...4.0
50°...70°C, kohms : 0.3...1.2

Connections 4 and
ground, Mohms min. : 1.0
Connections 7 and
ground Mohms min. : 1.0

Solenoid valve, start of injection
Connections 1 and 2
Test temperature :
15°...30°C, ohms : 14.3...17.3
50°...70°C, ohms : 15.5...21.0

Starting stop mV : 4120...4650

Shutoff stop mV : 650...850

C12

C12

Setting values of injection pump
Check values in brackets

Supply pump pressure:
Speed 1/min : 500
Checkbk. volt.
mV : 2245
Setting value, bar : 6.0...7.4

Timing device travel:
Speed 1/min : 500
Checkbk. volt
mV : 2245
Setting value, mm : 10.7...10.9

Full-load delivery :
1st temperature-conditioning
revolution 1/min : 2000
Checkbk. volt
mV : 2500
Output
temperature °C : 61
Speed 1/min : 750
Checkbk. volt
mV : 2480
Measuring
temperature °C : 57
Fuel delivery cm³/
> 1000s : 38.8...39.2
Dispersion cm³/ : 2.5
> 1000s :

Test specifications of injection pump
Check values in brackets

Supply pump pressure variations:

1st speed 1/min : 2000
Checkbk. volt
mV : 3890
Supply pump
pressure > bar : 8.2...9.6
> bar :

2st speed 1/min : 150
Checkbk. volt
mV : 2230
Supply pump
pressure > bar : min. 3.5
> bar :

Timing device variations:

1st speed 1/min : 500
Checkbk. volt. mV : 2245
Timing device
travel mm :
> mm : (9.8...11.8)

2nd speed 1/min : 2000
Checkbk. volt. mV : 3890
Timing device
travel mm : 11.5...12.9
> mm : (11.4...13.0)

3rd speed 1/min : 1400
Checkbk. volt. mV : 1475
Timing device
travel mm : max. 0.5
> mm : (max. 0.8)
Solenoid valve
Start of
injection, volts : 12

4.th speed 1/min : 300
Checkbk. volt. mV : 2245
Timing device
travel mm : 8.8...11.6
> mm : (8.6...11.8)

Overflow at overflow valve:

1st temperature-conditioning
revolution 1/min : 100
Checkbk. volt. mV : 2500
Output
temperature °C : 51
Speed 1/min : 2000
Checkbk. volt. mV : 3890
Measuring
temperature °C : 53
Overflow : 97...180
> cm³/10s : (83...194)

C13

C13

Fuel delivery variations:

1st temperature-conditioning
revolution 1/min : 100
Checkbk. volt mV : 2500
Output
temperature °C : 51
Speed 1/min : 2000
Checkbk. volt mV : 3890
Meßtemperatur °C : 53
Fuel delivery cm³/ : 48.2...51.2
> 1000s : (47.9...51.5)
Dispersion cm³/ : 2.5
> 1000s. : (2.5)

2nd temperature-conditioning
revolution 1/min : 2000
Checkbk. volt mV : 2500
Output
temperature °C : 60
Speed 1/min : 750
Checkbk. volt mV : 2480
Measuring
temperature °C : 56
Fuel delivery cm³/ :
> 1000s : (37.7...40.3)
Dispersion cm³/ :
> 1000s : (2.5)

3rd temperature-conditioning
revolution 1/min : 2000
Checkbk. volt mV : 2500
Output
temperature °C : 61
Speed 1/min : 500
Checkbk. volt mV : 2245
Measuring
temperature °C : 57
Fuel delivery cm³/ : 36.8...39.8
> 1000s : (36.0...40.6)
Dispersion cm³/ : 3.0
> 1000s : (3.0)

Idle delivery:
1st temperature-conditioning
revolution 1/min : 2000
Checkbk. volt mV : 2500
Output
temperature °C : 61
Speed 1/min : 500
Checkbk. volt mV : 1600
Meßtemperatur °C : 57
Fuel delivery cm³/ : 11.7...17.3
> 1000s : (11.5...17.5)
Solenoid valve
Start of
injection, volts : 12
Dispersion cm³/ : 3,0
> 1000s : (4.0)

Starting fuel delivery:
1st temperature-conditioning
revolution 1/min : 2000
Checkbk. volt mV : 2500
Output
temperature °C : 65
Speed 1/min : 100
Checkbk. volt mV : 2230
Measuring
temperature °C : 61
Fuel delivery cm³/ : 30.5...42.5
> 1000s : (28.5...44.5)
Solenoid valve
Start of
injection, volts : 12

Stop test:
Speed 1/min : 750
Checkbk. volt mV : 2480
ELAB volts : 0
Fuel delivery cm³/ :
max. 1000s : 3.0
Start of

Shutoff solenoid:
Cut-in voltage
min.> volts : 10,0
Rated voltage,
volts : 12,0

Notes:
High-pressure compressor sensor
Testing only possible with ballast
EPS 910

Take note of test instructions
"Distributor pump for direct
injectors"!

Dimensions for mounting and setting:

Description
K mm :
KF mm : 5.8...6.2
SVS max. mm :
FH mm :
TS : 1 467 010 376

C14

BOSCH INJECTION PUMP TEST SPECIFICATIONS

Obsereve notes in remark colum

Test sheet	: Chrysler
Date of manufacture	:
Edition	: 24.03.1997
Replaces	:
Test oil	: ISO 4113
Injection pump	: VE4/10E2100R635
Type No.	: 0 460 404 988
Customer Ident.No.	:

Customer-specific details

Customer	: Chrysler
Engine	:
Output kW	:
Speed 1/min	:

TEST BENCH PREREQUISITES

Inlet pressure, bar	: 0.30...0.40
Calibrating nozzle-holder assembly >	: 1 688 901 022
Opening pressure > bar	: 130...133
Test pressure line	: 1 680 750 073
Outer diameter	: 6.00
x wall thickness >	: 2.00
x length > mm	: 450
Overflow valve	:
Test line (fuel-delivery actuator)	: 0 986 612 442
Test line (solenoid valve start of injection)	: 1 687 011 208 (Test cable set)

ELECTRICAL TEST

Actuator
Connections 4 and 7
Test temperature:

15°...30°C, ohms	: 0.4...1.0
50°...70°C, ohms	: 0.45...1.1
Connections 4 and. ground, Mohms min.	: 1.0
Connections 7 and ground, Mohms min.	: 1.0
Connections 2 and 7 Mohms min.	: 1.0
Connections 4 and 6 Mohms min.	: 1.0

High-pressure compressor sensor
Sensor coils
Connections 1 and 3

kohms	: 4.9...6.5
Connections 2 and 3 kohms	: 4.9...6.5
Connections 1 and 2 kohms	: 9.8...13.0
Connections 1 and. ground, Mohms min.	: 1.0
Connections 2 and ground, Mohms min.	: 1.0
Connections 3 and ground, Mohms min.	: 1.0

Temperature sensor, fuel
Connentions 5 and 6
Test temperature:

15°...30°C, kohms	: 1.2...4.0
50°...70°C, kohms	: 0.3...1.2
Connections 5 and ground, Mohms min.	: 1.0
Connections 6 and ground Mohms min.	: 1.0

Solenoid valve, start of injection
Connections 1 and 2
Test temperature :

15°...30°C, ohms	: 14.3...17.3
50°...70°C, ohms	: 15.5...21.0
Starting stop mV	: 4120...4650
Shutoff stop mV	: 650...850

C15

C15

Setting values of injection pump
Check values in brackets

Supply pump pressure:
Speed 1/min : 1000
Checkbk. volt.
mV : 3100
Setting value, bar : 6.8...7.4

Timing device travel:
Speed 1/min : 1000
Checkbk. volt
mV : 3100
Setting value, mm : 6.9...7.1

Full-load delivery :
Speed 1/min : 1250
Checkbk. volt
mV : 3100
Fuel delivery cm^3/
> 1000s : 30.1...30.5
Dispersion cm^3/ : 2.5
> 1000s :

Test specifications of injection pump
Check values in brackets

Supply pump pressure variations:

1st speed 1/min : 2100
Checkbk. volt
mV : 3100
Supply pump
pressure > bar : 8.2...9.0
> bar :

2st speed 1/min : 500
Checkbk. volt
mV : 3100
Supply pump
pressure > bar : 6.0...6.8
> bar :

3st speed 1/min : 150
Checkbk. volt
mV : 3680
Supply pump
pressure > bar : min. 3.5
> bar :

Timing device variations:

1st speed 1/min : 500
Checkbk. volt. mV : 3100
Timing device
travel mm : 5.3...6.7
> mm : (5.0...7.0)

2nd speed 1/min : 1000
Checkbk. volt. mV : 3100
Timing device
travel mm :
> mm : (6.1...7.9)

3rd speed 1/min : 1500
Checkbk. volt. mV : 1680
Timing device
travel mm : 0.0...0.5
> mm : (0.0...1.5)
Solenoid valve
Start of
injection, volts : 12

Overflow at overflow valve:

Speed 1/min : 2100
Checkbk. volt. mV : 3100
Overflow : 56...167
> cm^3/10s :

C16

C 16

Fuel delivery variations:

1. Speed	1/min	: 2100
Checkbk. volt	mV	: 3100
Fuel delivery	cm³/	: 64.0...66.0
>	1000s	: (63.0...67.0)
Dispersion	cm³/	: 2.0
>	1000s.	:
2. Speed	1/min	: 1250
Checkbk. volt	mV	: 2270
Fuel delivery	cm³/	:
>	1000s	: (29.0...31.6)
Dispersion	cm³/	:
>	1000s	: (3.0)
3. Speed	1/min	: 1000
Checkbk. volt	mV	: 3100
Fuel delivery	cm³/	: 67.2...69.2
>	1000s	: (66.2...70.2)
Dispersion	cm³/	: 2.0
>	1000s	:
4. Speed	1/min	: 500
Checkbk. volt	mV	: 2660
Fuel delivery	cm³/	: 43.7...45.7
>	1000s	: (42.5...46.5)
Dispersion	cm³/	: 2.0
>	1000s	:

Idle delivery:

Speed	1/min	: 400
Checkbk. volt	mV	: 2000
Fuel delivery	cm³/	: 12.0...14.2
>	1000s	: (10.9...15.5)
Solenoid valve Start of injection, volts		: 12
Dispersion	cm³/	: 2.5
>	1000s	: (3.0)

Starting fuel delivery:

Speed	1/min	: 100
Checkbk. volt	mV	: 3680
Fuel delivery	cm³/	:
>	1000s	: (72.0...82.0)
Solenoid valve Start of injection, volts		: 12

Stop test:

Speed	1/min	: 2100
Checkbk. volt	mV	: 3100
ELAB	volts	: 0
Fuel delivery max.	cm³/ 1000s	: 3.0

Shutoff solenoid:

Cut-in voltage min.> volts	: 10.0
Rated voltage, volts	: 12.0

Dimensions for mounting and setting:

Description		
K	mm	:
KF	mm	:
SVS max.	mm	:
FH	mm	:

C17

BOSCH INJECTION PUMP TEST SPECIFICATIONS

Obsereve notes in remark colum

Test sheet	: Alfa
Date of manufacture	:
Edition	: 12.01.1994
Replaces	:
Test oil	: ISO 4113
Injection pump	: VE4/10E2100L585
Type No.	: 0 460 404 991
Customer Ident.No.	:

Customer-specific details

Customer	: ALFA
Engine	: 425 CHIEA
Output kW	:
Speed 1/min	:

TEST BENCH PREREQUISITES

Inlet pressure, bar	: 0.30...0.40
Calibrating nozzle-holder assembly >	: 1 688 901 022
Opening pressure > bar	: 130...133
Test pressure line	: 1 680 750 073
Outer diameter	: 6.00
x wall thickness >	: 2.00
x length > mm	: 450
Overflow valve	:
Test line (fuel-delivery actuator)	: 0 986 612 442
Test line (solenoid valve start of injection)	: 1 687 011 208 (Test cable set)

ELECTRICAL TEST

Actuator
Connections 4 and 7
Test temperature:

15°...30°C, ohms	: 0.4...1.0
50°...70°C, ohms	: 0.45...1.1
Connections 4 and. ground, Mohms min.	: 1.0
Connections 7 and ground, Mohms min.	: 1.0
Connections 2 and 7 Mohms min.	: 1.0
Connections 4 and 6 Mohms min.	: 1.0

High-pressure compressor sensor
Sensor coils
Connections 1 and 3

kohms	: 4.9...6.5

Connections 2 and 3

kohms	: 4.9...6.5

Connections 1 and 2

kohms	: 9.8...13.0
Connections 1 and. ground, Mohms min.	: 1.0
Connections 2 and ground, Mohms min.	: 1.0
Connections 3 and ground, Mohms min.	: 1.0

Temperature sensor, fuel
Connentions 5 and 6
Test temperature:

15°...30°C, kohms	: 1.2...4.0
50°...70°C, kohms	: 0.3...1.2
Connections 5 and ground, Mohms min.	: 1.0
Connections 6 and ground Mohms min.	: 1.0

Solenoid valve, start of injection
Connections 1 and 2

Test temperature	:
15°...30°C, ohms	: 14.3...17.3
50°...70°C, ohms	: 15.5...21.0
Starting stop mV	: 4120...4650
Shutoff stop mV	: 650...850

C18

C18

Setting values of injection pump
Check values in brackets

Supply pump pressure:
Speed 1/min : 1000
Checkbk. volt.
mV : 3100
Setting value, bar : 6.8...7.4

Timing device travel:
Speed 1/min : 1000
Checkbk. volt
mV : 3100
Setting value, mm : 6.9...7.1

Full-load delivery :
speed 1/min : 1250
Checkbk. volt
mV : 2270
Fuel delivery cm³/
> 1000s : 30.1...30.5
Dispersion cm³/ : 2.0
> 1000s :

Test specifications of injection pump
Check values in brackets

Supply pump pressure variations:

1st speed 1/min : 2100
Checkbk. volt
mV : 3100
Supply pump
pressure > bar : 8.2...9.0
> bar :

2st speed 1/min : 500
Checkbk. volt
mV : 3100
Supply pump
pressure > bar : 6.0...6.8
> bar :

3st speed 1/min : 150
Checkbk. volt
mV : 3680
Supply pump
pressure > bar : min. 3.5
> bar :

Timing device variations:

1st speed 1/min : 500
Checkbk. volt. mV : 3100
Timing device
travel mm : (5.3...6.7)
> mm : (5.0...7.0)

2nd speed 1/min : 1000
Checkbk. volt. mV : 3100
Timing device
travel mm :
> mm : (6.1...7.9)

3rd speed 1/min : 1500
Checkbk. volt. mV : 1680
Timing device
travel mm : 0.0...0.5
> mm : (0.0...1.5)
Solenoid valve
Start of
injection, volts : 12

Overflow at overflow valve:

speed 1/min : 2100
Checkbk. volt. mV : 3100
Overflow : 56...167
> cm³/10s :

C19

Fuel delivery variations:

Speed	1/min	: 2100
Checkbk. volt	mV	: 3100
Fuel delivery	cm³/	: 64.0...66.0
>	1000s	: (63.0...67.0)
Dispersion	cm³/	: 2.0
>	1000s.	:
Speed	1/min	: 1250
Checkbk. volt	mV	: 2270
Fuel delivery	cm³/	:
>	1000s	: (29.0...31.6)
Dispersion	cm³/	:
>	1000s	: (3.0)
Speed	1/min	: 1000
Checkbk. volt	mV	: 3100
Fuel delivery	cm³/	: 67.2...69.2
>	1000s	: (66.2...70.2)
Dispersion	cm³/	: 2.0
>	1000s	:
Speed	1/min	: 500
Checkbk. volt	mV	: 2660
Fuel delivery	cm³/	: 43.7...45.7
>	1000s	: (42.5...46.5)
Dispersion	cm³/	: 2.0
>	1000s	:

Idle delivery:

Speed	1/min	: 400
Checkbk. volt	mV	: 2000
Fuel delivery	cm³/	: 12.0...14.2
>	1000s	: (10.9...15.5)
Solenoid valve		
Start of		
injection, volts		: 12
Dispersion	cm³/	: 2.5
>	1000s	: (3.0)

Starting fuel delivery:

Speed	1/min	: 100
Checkbk. volt	mV	: 3680
Fuel delivery	cm³/	:
>	1000s	: 72.0...82.0
Solenoid valve		
Start of		
injection, volts		: 12

Stop test:

Speed	1/min	: 2100
Checkbk. volt	mV	: 3100
ELAB	volts	: 0
Fuel delivery	cm³/	:
max.	1000s	: 3.0

Shutoff solenoid:

Cut-in voltage	
min.> volts	: 10.0
Rated voltage,	
volts	: 12.0

Dimensions for mounting and setting:

Description		
K	mm	:
KF	mm	:
SVS max.	mm	:
FH	mm	:

C20

C20

BOSCH INJECTION PUMP TEST SPECIFICATIONS

Obsereve notes in remark colum

Test sheet	: Audi
Date of manufacture	:
Edition	: 21.04.1993
Replaces	:
Test oil	: ISO 4113
Injection pump	: VE4/10E2250R530
Type No.	: 0 460 404 992
Customer Ident.No.	:

Customer-specific details

Customer	: Audi
Engine	: 1.9 TDI EDC
Output kW	:
Speed 1/min	:

TEST BENCH PREREQUISITES

Inlet pressure, bar	: 0,30...0,40
Calibrating nozzle-holder assembly >	: 1 688 901 114
Opening pressure > bar	: 207...210
Test pressure line	: 1 680 750 085
Outer diameter	: 6.00
x wall thickness >	: 2.20
x length > mm	: 350
Overflow valve	: 2 467 413 018
Test line	: 0 986 612 440
(fuel-delivery actuator)	: (KDEP 1865/10)
Test line	: 0 986 611 983
Solenoid valve start of injection)	: (KDEP 1190)

TEST PRECONDITIONS

Test oil return temp. > °C with thermometer	: 55
Test oil supply temperature > °C	: 42...47
Hold-up revolutions >1/min	: 1200
Feedback voltage mV	: 2500

ELECTRICAL TEST

Actuator
Connections 4 and 7
Test temperature:

15°...30°C, ohms	: 0.4...1.0
50°...70°C, ohms	: 0.45...1.1
Connections 4 and. ground, Mohms min.	: 1.0
Connections 7 and ground, Mohms min.	: 1.0

Connections 3 and 4

Mohms min.	: 1.0

Connections 6 and 7

Mohms min.	: 1.0

High-pressure compressor sensor
Sensor coils
Connections 1 and 3

Ohms	: 4.9...6.5

Connections 2 and 3

Ohms	: 4.9...6.5

Connections 1 and 2

Ohms	: 9.8...13.0
Connections 1 and. ground, Mohms min.	: 1.0
Connections 2 and ground, Mohms min.	: 1.0
Connections 3 and ground, Mohms min.	: 1.0

Temperature sensor, fuel
Connentions 5 and 6
Test temperature:

15°...30°C, kohms	: 1.2...4.0
50°...70°C, kohms	: 0.3...1.2
Connections 5 and ground, Mohms min.	: 1.0
Connections 6 and ground Mohms min.	: 1.0

Solenoid valve, start of injection
Connections 1 and 2
Test temperature :

15°...30°C, ohms	: 14.3...17.3
50°...70°C, ohms	: 15.5...21.0
Starting stop mV	: 4120...4650
Shutoff stop mV	: 650...850

C21

C21

Setting values of injection pump
Check values in brackets

Supply pump pressure:
Speed 1/min : 750
Checkbk. volt.
mV : 2480
Setting value, bar : 6.3...6.8

Timing device travel:
Speed 1/min : 500
Checkbk. volt
mV : 2245
Setting value, mm : 9.3...11.7

Full-load delivery :
1st temperature-conditioning
revolution 1/min : 2000
Checkbk. volt
mV : 2500
Output
temperature °C : 61
Speed 1/min : 750
Checkbk. volt
mV : 2480
Measuring
temperature °C : 57
Fuel delivery cm³/
> 1000s : 38.8...39.2
Dispersion cm³/ : 2.5
> 1000s :

Test specifications of injection pump
Check values in brackets

Supply pump pressure variations:

1st speed 1/min : 2000
Checkbk. volt
mV : 3890
Supply pump
pressure > bar : 8.6...9.6
> bar :

2st speed 1/min : 500
Checkbk. volt
mV : 2245
Supply pump
pressure > bar : 6.2...7.2
> bar :

3st speed 1/min : 150
Checkbk. volt
mV : 2230
Supply pump
pressure > bar : min. 3.5
> bar :

Timing device variations:

1st speed 1/min : 500
Checkbk. volt. mV : 2245
Timing device
travel mm :
> mm : (8.9...12.1)

2nd speed 1/min : 2000
Checkbk. volt. mV : 3890
Timing device
travel mm : 11.6...12.8
> mm : (11.4...13.0)

3rd speed 1/min : 1400
Checkbk. volt. mV : 1475
Timing device
travel mm : max. 0.5
> mm : (max. 0.8)
Solenoid valve
Start of
injection, volts : 12

4.th speed 1/min : 300
Checkbk. volt. mV : 2245
Timing device
travel mm : 9.3...11.7
> mm : (8.9...12.1)

5.th speed 1/min : 150
Checkbk. volt. mV : 2230
Timing device
travel mm : min. 1.5
> mm :

Overflow at overflow valve:

1st temperature-conditioning
revolution 1/min : 100
Checkbk. volt. mV : 2500
Output
temperature °C : 51
Speed 1/min : 2000
Checkbk. volt. mV : 3890
Measuring
temperature °C : 53
Overflow : 83...167
> cm³/10s :

C22

C22

Fuel delivery variations:

1st temperature-conditioning		
revolution	1/min	: 100
Checkbk. volt	mV	: 2500
Output		
temperature	°C	: 51
Speed	1/min	: 2000
Checkbk. volt	mV	: 3890
Meßtemperatur	°C	: 53
Fuel delivery	cm³/	: 48.4...51.0
>	1000s	: (47.9...51.5)
Dispersion	cm³/	: 2.5
>	1000s.	: (2.5)
2nd temperature-conditioning		
revolution	1/min	: 2000
Checkbk. volt	mV	: 2500
Output		
temperature	°C	: 61
Speed	1/min	: 750
Checkbk. volt	mV	: 2480
Measuring		
temperature	°C	: 57
Fuel delivery	cm³/	:
>	1000s	: (37.7...40.3)
Dispersion	cm³/	:
>	1000s	: (2.5)
3rd temperature-conditioning		
revolution	1/min	: 2000
Checkbk. volt	mV	: 2500
Output		
temperature	°C	: 61
Speed	1/min	: 500
Checkbk. volt	mV	: 2245
Measuring		
temperature	°C	: 57
Fuel delivery	cm³/	: 36.9...39.5
>	1000s	: (35.9...40.5)
Dispersion	cm³/	: 3.0
>	1000s	: (3.0)

Idle delivery:

1st temperature-conditioning		
revolution	1/min	: 2000
Checkbk. volt	mV	: 2500
Output		
temperature	°C	: 61
Speed	1/min	: 500
Checkbk. volt	mV	: 1600
Meßtemperatur	°C	: 57
Fuel delivery	cm³/	: 11.5...16.5
>	1000s	: (11.0...17.0)
Solenoid valve		
Start of		
injection, volts		: 12
Dispersion	cm³/	: 4.0
>	1000s	: (4.0)

Starting fuel delivery:

1st temperature-conditioning		
revolution	1/min	: 2000
Checkbk. volt	mV	: 2500
Output		
temperature	°C	: 65
Speed	1/min	: 100
Checkbk. volt	mV	: 2230
Measuring		
temperature	°C	: 61
Fuel delivery	cm³/	: 33.4...43.4
>	1000s	: (30.4...46.4)
Solenoid valve		
Start of		
injection, volts		: 12

Stop test:

Speed	1/min	: 750
Checkbk. volt	mV	: 2480
ELAB	volts	: 0
Fuel delivery	cm³/	:
max.	1000s	: 3.0

Shutoff solenoid:

Cut-in voltage		
min.>	volts	: 10.0
Rated voltage,		
	volts	: 12.0

C23

C23

Notes:
High-pressure compressor sensor
Testing only possible with ballast
EPS 910

Take note of test instructions
"Distributor pump for direct
injectors"!

Dimensions for mounting and setting:

Description		
K	mm	: 3.6...3.8
KF	mm	: 5.8...6.2
SVS max.	mm	:
FH	mm	:
TS		: 1 467 010 376

C24

C24

① Test Specifications Fuel Injection Pumps and Governors

WPP 001/4 MB 5.7 I

En

Edition 5.72

PES 6 A 80 C 410 RS 2085 (D)

RSV 575-1100 A7B 533 D (1)
RSV 300- 900 A7B 528 (2)
RSV 575-1250 A1B 533 D (3)

RSV 300-1500 A2B 439 D
RSV 300-1100 A2B 439 D
RSV 600-1100 A4B 439 D

supersedes: 6.70
company: Daimler-Benz
engine: OM 352

Mähdrescher: 108 PS (1)
Aggregat: 75 PS (2)
Mähdrescher: 118 PS (3)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

Testoil-ISO 4113

A. Fuel Injection Pump Settings

Port closing at prestroke 2.15 + 0.1 mm (from BDC)

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm³/100 strokes 3	Difference cm³/100 strokes 4	Control rod travel mm 2	Fuel delivery cm³/100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1000	6	2.2 - 3.0	0.4			
	9	5.5 - 6.0				
	15	11.5 - 12.8				
200	6	1.3 - 2.2				

Adjust the fuel delivery from each outlet according to the values in ☐

B. Governor Settings

RSV 575 - 1100 A7B 533 D (1)

Upper rated speed: Degree of deflection of control lever 1	rev/min Control rod travel mm 2	Control rod travel mm ① rev/min ⑤ 3	Intermediate rated speed: Degree of deflection of control lever 4	rev/min 5	Control rod travel mm 6	Lower rated speed: Degree of deflection of control lever 7	rev/min 8	Control rod travel mm ④ 9	Sliding sleeve travel Torque-control travel: rev/min 10	Control rod travel ③ mm 11
ca. 56.5	1100	12.0	without auxiliary spring			ca. 25	575	5.0		
	1100	7.0					200	19 - 21	1080	0
	1120	2.4					575	4.7 – 5.3		
ca. 56	1100	8.2 – 9.4	with auxiliary spring				600	2.8 – 4.0	900	0.1 – 0.3
	1130	3.0 – 4.4					660	0 - 1	650	0.3 – 0.5
	1180	0 - 1								

Torque control travel a = mm

C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp. ()° ② min⁻¹ 1	cm³/1000 Hübe 2	Rotational-speed limitation ④ min⁻¹ 3	Fuel delivery characteristics rev/min 4	③a ④a cm³/1000 strokes 5	Starting fuel delivery idle switching point rev/min 6	cm³/1000 strokes mm RW 7	Intermediate rotational speed ⑤a Torque-control travel rev/min 8	mm RW
(20°) 1080	56.5 – 58.5	1100 *	800	54.0 – 57.0	100	13.2 – 13.8	575	5.0
			500	49.0 - 52.0				
(40°) 1060	56.0 – 57.0		800	52.5 – 55.5				
			500	48.0 – 51.0				

./.

Checking values in brackets

* 1 mm less control rod travel than col. 2

10.75

B. Governor Settings

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel ③	
Degree of deflection of control lever	rev/min Control rod travel mm	Control rod travel ① mm rev/min ⑤	Degree of deflection of control lever	rev/min	Control rod travel mm	Degree of deflection of control lever	rev/min	Control rod travel mm ④	rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9	10	11
ca. 49.5	900	16.0	without auxiliary spring							
	920	9.6								
	930	4.8								
ca. 48	900	7.5 – 8.0	with auxiliary spring							
	920	2.4 – 3.7								
	950	0 - 1								

RSV 575-1250 A1B 533 D (3)

ca. 62	1250	16.0	without auxiliary spring	ca. 28	575	5.5	1230	0
	1280	11.8			200	19 – 21		
	1320	5.0			575	5.2 – 5.8	650	0.3 – 0.5
ca. 60	1250	ca. 8.5			620	2.0 – 3.6		
	1295	ca. 3.0	with auxiliary spring		700	0 - 1		
	1350	0 – 1						

RSV 300-1500 A2B 439 D

ca. 60	1500	16.0	without auxiliary spring	ca. 22	300	7.5	1480	0
	1550	12.2			150	19 – 21		
	1610	7.0			300	7.2 – 7.8	1200	0.7 – 0.9
	1600	6.2 – 9.0			400	4.7 – 6.6	400	0.9 – 1.1
	1700	1.6 – 2.3	with auxiliary spring		500	3.1 – 5.4		
	1820	0 – 1			800	0 - 1		

RSV 300-1100 A2B 439 D

ca. 43	1100	16.0	without auxiliary spring	ca. 19	300	7.5	1080	0
	1150	12.0			150	19 – 21		
	1190	8.0			300	7.2 – 7.8	800	0 – 0.2
	1180	7.2 – 10.0			500	3.1 – 5.2		
	1250	4.2 – 6.1	with auxiliary spring		760	0 – 1	450	0 – 0.2
	1440	0 - 1						

RSV 600-1100 A4B 439 D

ca. 72	1100	16.0	without auxiliary spring	ca. 44	600	7.5	1080	0
	1150	11.0			100	19 – 21	1000	0.1 – 0.3
	1180	6.8			600	7.2 – 7.8	900	0.5 – 0.7
	1180	5.8 – 8.0			700	3.3 – 5.2	600	0.7 – 0.9
	1200	1.1 – 4.0	with auxiliary spring		850	0 – 1		
	1320	0 - 1						

Torque control travel a = 0 mm

C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp. ()°		Rotational-speed limitation intermediate speed	Fuel delivery characteristics high idle speed		Starting fuel delivery idle switching point		Torque-control travel	
								Control rod travel
rev/min	cm³/1000 strokes	rev/min	rev/min	cm³/1000 strokes	rev/min	cm³/1000 strokes	rev/min	mm
1	2	3	4	5	6	7	8	9
(20°) 880	48.5 – 50.5	900 *			100	13.2 – 13.8		
(2)								
(40°) 880	48.0 – 50.0							
(3)								
(40°) 1230	55.5 – 57.5	1290 – 1300 3 mm RW	800 500	52.5 – 55.5 48.0 – 51.0	100	13.2 – 13.8		

Checking values in brackets

* 1 mm less control rod travel than col. 2

D2